THE IRON TRADE REVIEW

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SIGNS OF PROSPERITY

COMING FROM MANY PARTS OF THE COUNTRY.

Recent Sales of Pig Iron Heavy and Inquiry Now Very Active—Scarcity of Billets in the East.

New signs of increasing prosperity are constantly appearing, but times of prosperity bring their troubles as well as do periods of depression, and some large companies are having much difficulty in filling their contracts. One independent concern purchased 5,000 tons of bars from a Steel Corporation company, but the specifications for a considerable tonnage did not prove satisfactory, and only a part of the order will be filled. There is almost a billet famine in the east. One important company operating all of its open-hearth furnace capacity can not produce enough steel to supply its finishing mills. No large tonnage can be bought anywhere in the east, and $25 at mill would probably be the best figure on any eastern tonnage available. The scrap situation is also worrying the eastern steel mills. Taking advantage of the dullness incident to the Fourth of July holiday and inventory taking, several mills tried to break the old material market last week, but without success. Mills are offering $16 for heavy melting steel, and getting very little at that figure. A most interesting development of the scrap situation is the decision of an important eastern steel producer to start some Bessemer capacity, later running the product through the open-hearth furnaces to avoid the use of scrap. This duplex process has been used for some time in the south. Whether it will be more economical than buying scrap in the north remains to be demonstrated.

Heavy Pig Iron Sales

Thorough investigation shows that our estimate last week of sales to the leading harvester, radiator and cast iron pipe interests was too low, and it is now clear that over 100,000 tons were purchased by these interests during the first week of July. The International Harvester Co. has made some additional purchases within a few days. In eastern territory, a number of furnaces are behind in deliveries, and consumers are clamoring for iron. Throughout the country inquiry is active, but few important transactions have been made. In the south, the market is especially quiet following recent advances. In steel making irons, the leading harvester interest has purchased 5,000 tons of basic, and a Pittsburg concern has contracted for 1,200. Announcement concerning an important transaction in Bessemer is expected soon.

Fine Ore Prospects

Larger sales of ore are being made, and the outlook for the season is most encouraging. Some shippers are predicting that in spite of the strike on the lakes and other drawbacks, this season's shipments will be equal to those of the record year 1907, while it is freely predicted that 1910 will see a tremendous movement, amounting to 50,000,000 tons.

Structural Material

Bookings of structural shapes are not so numerous as they have been, but specifications on contracts are excellent. Among recent new contracts are: Lock gates for the Panama canal, 1,600 tons, the United Engineering & Foundry Co.; Frick building, at East Liberty, Pa., 1,500 tons, to the Carnegie Steel Co.; sheet piling for an irrigation plant at Helena, Mont., 1,800 tons, the Jones & Laughlin Steel Co.; First National bank building, Denver, 1,800 tons, to the Minneapolis Steel & Machinery Co.

Railroad Buying

The Chesapeake & Ohio has placed orders chiefly with the American Car & Foundry Co. for 1,000 steel hoppers, and 2,000 box cars in addition to former orders. The Northern Pacific has ordered 1,000 wooden box cars from the Pullman Co., and the Baltimore & Ohio is expected to close soon on its inquiry for 3,600 all-steel cars and 2,000 steel underframe cars. The St. Paul, Pennsylvanita Lines west, Pere Marquette and Pennsylvania Terminal of New York, have placed orders aggregating about 4,000 tons of structural material. Scattering rail sales amounted to about 5,000 tons, and a good tonnage is under negotiation. The demand for light rails has improved, and prices are advancing.

Bar Iron Combine

Evidently, some progress is being made toward the combination of half a dozen leading bar iron producers of the eastern district. The bar iron market shows some improvement, and a few mills which expected to be idle throughout July will resume next week.

HUGHES PRODUCERS FOR NEW STEEL PLANT.

The Maryland Steel Co. has just placed a contract with The Wellman-Seaver-Morgan Co., Cleveland, for gas producers for the new open-hearth steel plant at Sparrows Point, Md. These producers will be of the well-known Hughes continuous mechanically stirred type. The producers will embody the latest improvements and will be equipped with the Hughes patent ash cleaning hopper. This installation is a distinct advance in open-hearth steel practice, and the adoption of the self-cleaning ash hopper insures a uniform discharge of ashes from the producer, besides effecting a substantial saving in the cost of gas house labor.

THE WEEK IN IRON CENTERS

PITTSBURG.

Strong Demand for Finished Material —Pig Iron Rather Quiet.

Office of THE IRON TRADE REVIEW, 510 Park Building, July 13.

With the movement of iron and steel products taken as a trustworthy barometer of conditions, it is becoming more evident that the general trade activity of the country is expanding in a marked degree. The increased demand for finished and semi-finished material is practically universal from all sections and its growth in the past several months has been evenly maintained. In some departments of the Carnegie Steel Co. the number of individual orders recently received has been the largest in the history of the company.

The tariff bill appears to be fully discounted and interest is centered upon the crops, advance reports of which are favorable. Some elements of uncertainty have been presented by the labor situation and developments are being closely watched. The American Sheet & Tin Plate Co. continues to increase its sheet production by starting non-union plants, but little change is noted in tin plate operations. One of the principal independents, the Youngstown Sheet & Tube Co., has not signed the sheet scale with the Amalgamated Association of Iron, Steel & Tin Workers, but has arranged its puddling mill agreement with the Sons of Vulcan. The iron mills of the Republic Iron & Steel Co. are still idle pending the settlement of the boiling and finishing scales.

The heavy call for material being made upon the mills is well illustrated in the increasing reluctance of the principal makers, with capacities running practically full, to take on additional obligations in merchant steel, namely billets, sheet and tin bars and slabs. Actual shortages of steel for finishing operations have been encountered and some companies are taking the position of rejecting all new orders for the raw product.

The market has been concerned with an indefinite report that the United States Steel Corporation is likely soon to be a buyer of pig iron. This appears to have arisen from the high rate of activity among the blast furnace plants of the company and the increased demand for steel from the finishing mills. With but very few exceptions the direct-metal stacks of the corporation, those located adjacent to steel works, are in operation and the idle capacity is largely of the high-cost class with respect to the present market price of either Bessemer or basic pig iron. The Carnegie Steel Co. this week increased its furnace activity to approximately 85 per cent and started its North Sharon works, leaving only the Columbus plant and a few isolated stacks in idleness. The Republic Iron & Steel Co., the Jones & Laughlin Steel Co., the National Tube Co. and the Cambria Steel Co. are all running their furnace capacity full.

Pig Iron.—Strength is displayed in the pig iron market, although the present buying movement is only moderate. Prices in all grades are inclining upwards. Specifying against last half contracts has been favorably inaugurated.

Steel-making iron is moving in a fair volume. The International Harvester Co. has purchased 5,000 tons of basic for last half from western furnaces. A local interest took 1,200 tons of basic for May and June at $15 valley, and the present market for this grade is at about this price. Bessemer has stiffened and $15.50 valley is now the minimum. A lot of 500 tons prompt Bessemer went this week at $15.50 valley. Malleable is held at from $15 to $15.25 valley. A consumer in this district took 750 tons for immediate shipment at $15 valley. A local inquiry is out for 3,000 tons for prompt delivery.

A few furnaces are quoting $15 on prompt No. 2 foundry, but $15.25 to $15.50 is generally asked on this grade for forward shipment. A small lot for July sold at $15.25 valley. Two melters in this district are out for from 500 to 1,000 tons each for last half. There is some forge inquiry. Valley operations show nine out of 17 merchant stacks in blast.

The Republic Iron & Steel Co. this week raised its price on No. 2 southern to $13 Birmingham for last half, all inquiries being subject to submission. The company took this action following its having booked considerable tonnage at $12.50 Birmingham.

On prompt and third quarter shipment on northern iron, we quote as follows:

Bessemer, valley	$15.50
Bessemer, Pittsburg	16.40
No. 2 foundry, Pittsburg	15.90 to 16.40
Gray forge, Pittsburg	15.15 to 15.40
Basic, valley	15.00 to 15.25
Basic, Pittsburg	15.90 to 16.15

Ferro-Alloys.—The passing of the tariff bill by the senate has put the probable ferro-alloy duties upon a more definite basis, but sales continue to be made with duty to the account of the buyer. Although considerable ferro-manganese has been brought over the past several months, the market has not shown any especial strengthening. For strictly first half deliveries, from $43 to $43.50 seaboard is being asked, although sales for shipment running into 1910 have been made at lower figures. For this year $41.50 to $42 seaboard is quoted. A steel company is in the market for 200 tons for prompt shipment. In 50 per cent ferro-silicon, a local steel company bought 200 tons the past week at about $62 delivered. We quote ferro-manganese at from $41.50 to $42 Baltimore at present duty for prompt or future delivery, with a freight rate of $1.95 to Pittsburg.

Fifty per cent ferro-silicon is quoted at $61.50 to $62.50 Pittsburg on forward deliveries, at present duty; domestic, 12 per cent, $25; 11 per cent, $24; 10 per cent, $23 Pittsburg.

Plates.—The Alabama Great Southern railroad has placed 625 steel cars, of which 375 are gondolas and 250 hoppers, with the Standard Steel Car Co., and 200 flat cars with the Pressed Steel Car Co. The steel, about 10,000 tons including the axles for these cars, will be furnished by the Carnegie Steel Co. It is also reported that the 1,000 steel car order of the Buffalo, Rochester & Pittsburg has been taken by the Cambria Steel Co. The general level of plate prices is 1.35c Pittsburg, although the Jones & Laughlin Steel Co. has made further advances from this quotation and is now asking 1.40c Pittsburg. This company is entering some orders at this figure. Specifications in plates are good and considerable new business is being taken. The prospects of the market are quite promising, this being notably true with respect to contemplated steel car construction which will require a heavy tonnage. We quote the present market as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.35 to 1.40c mill. Extras are as follows per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c;

over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The American Sheet & Tin Plate Co. continues to start idle non-union sheet plants and is getting its production back to the point at which it was interrupted by the strike of the Amalgamated Association. This week the company resumed operations at its Hyde Park plant of six mills at Hyde Park, Pa., and is preparing to start other mills. At the present time, the company is operating 123 mills or 66 per cent compared with an active capacity of 141 mills or 76 per cent before the strike. Many independent mills, having signed the scale of the Amalgamated, are operating steadily at about 90 per cent of capacity. Sheet prices continue to harden and concessions in the middle western districts, which ranged from $3 on galvanized to $1 on plain black sheets have practically disappeared. Some interests in the west are, however, still aggressive with cut price policies. We quote present regular prices as follows:

Blue annealed sheets, Nos. 10 and heavier, 1.60c; Nos. 11 and 12, 1.65c; Nos. 13 and 14, 1.70c; Nos. 15 and 16, 1.80c; box annealed sheets, Nos. 10 to 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 1.95c; Nos. 17 to 21, 2c; Nos. 22 to 24, 2.05c; Nos. 25 and 26, 2.10c; No. 27, 2.15c; No. 28, 2.20c; No. 29, 2.25c; No. 30, 2.35c; galvanized sheets, Nos. 13 and 14, 2.25c; Nos. 15 and 16, 2.40c; Nos. 17 to 21, 2.50c; Nos. 22 to 24, 2.65c; Nos. 25 and 26, 2.85c; No. 27, 3.05c; No. 28, 3.25c; No. 29, 3.40c; No. 30, 3.65c; painted roofing sheets, $1.55 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $2.80 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—There has been little change in the strike situation between the American Sheet & Tin Plate Co. and the Amalgamated Association of Iron, Steel and Tin Workers. The company has increased its operations with non-union men at its Elwood, Ind., plant, and is now running that works at partial capacity. The other union plants continue idle, but preparations are being made to start some of them soon. This week the operations of the company are better than 40 per cent of capacity. New business in tin plate is normally light at this season, but shipments to the canning trade are going forward actively. Independent tin plate plants have been booking some contracts through consumers protecting themselves against the possibility of a prolonged strike against the leading interest, and a number of these interests are now well sold up. Of the practically 100 independent tin mills in the country, about 95 per cent are active. Tin plate prices are regular and we quote the present market as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.45 f. o. b. mill Pittsburg district and $3.40 in large lots. Terms 30 days less 2 per cent for cash in 10 days.

Rails and Track Material.—Rail prospects are steadily improving and some roads which draw their supply from this district are making preliminary overtures for tonnage. The light rail market is advancing and orders are being booked at fully $1 a ton more than the nominal schedule of the past several months. The Carnegie Steel Co. last week booked 2,000 tons. The standard spike market is stronger and prices are less subject to concessions. An Ohio road has just placed an order for 2,500 kegs. The small spike market which has been more or less irregular is also better. We quote the market on Bessemer rails as follows, the price on open-hearth rails being $30 mill.

Fifty-pound and heavier, 500-ton and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 8-pound, $30; 12-pound, $29; 16 to 25-pound, $28; 30 to 35-pound, $27.75; 40 to 45-pound, $27; angle splice bars for standard sections, 1.50c Pittsburg; standard spikes, 1.65c to 1.70c Pittsburg; hand spikes, 1.60c to 1.70c Pittsburg.

Steel.—German steel makers have recently been selling billets in Canadian territory on a basis of $22.50 delivered Montreal, duty not paid, for base sizes of basic Bessemer billets. This is equivalent to a price of about $19 German mill. The Canadian duty against German steel is $2.50 a ton. Steel makers of the United States during the depression sold billets for Montreal delivery at $19 mill, but the increased consumption of intermediate steel by the finishing mills has made this export trade less desirable for them. The $19 German mill price on billets does not permit exporting to the United States, as the present duty is prohibitive with relation to the current price of steel in this country. There is increasing scarcity of both Bessemer and open-hearth steel among the mills and consumers are having difficulty in placing large lots. A contract for large Bessemer tonnage offered the mills this week by a consumer at a cut price was rejected. Open-hearth billets are selling at from $1 to $2 premium over the $23 price. Sales of sheet bars were closed this week at $25 mill with the full weight added, which illustrates the attitude of principal makers to no longer absorb half the freight within certain limits.

Bessemer 4 x 4 billets with 0.25 carbon and less are regularly quoted at $23 Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets from $23 to $25 Pittsburg. Forging billets range from $25 to $27 Pittsburg. The regular quotation on sheet and tin bars is $25 Pittsburg.

Hoops and Bands.—A favorable demand for hoops is noted from the miscellaneous consumers, but there is not a great deal of activity in the cooperage trade by reason of the quiet season for such companies which is now prevailing. Attractive specifications in hoops are responsible for some price irregularity. We quote the present market as follows:

Hoops in carload lots, 1.50c; in less than carload lots, 1.60c; bands, 1.20c, base half extras as per standard steel.

Merchant Bars.—The minimum price on steel bars continues 1.25c Pittsburg, which may be obtained only upon desirable specifications. Such principal makers as Republic Iron & Steel Co., Jones & Laughlin Steel Co. and the Cambria Steel Co. are quoting 1.30c Pittsburg. Some business has been entered at this level, a sale this week of 1,000 tons being a notable instance. Some makers will not accept contracts at present prices for more than three months ahead. Bar specifications are heavy and the buying movement continues strong. Bar iron shows an advancing tendency and 1.45c mill and higher in the Pittsburg and Youngstown districts has been quoted. In the west, 1.40c mill has been done, although 1.35c more fairly represents the market. Shafting is firmer and the regular discounts are being more strictly observed. The Republic Iron & Steel Co. this week started its steel works and Brown Bonnell plant, the remaining mills continuing idle because of the scale controversy with the Amalgamated association. We quote the present market as follows:

Common iron bars, 1.40c to 1.45c, Pittsburg; Bessemer and open-hearth steel bars, 1.25c to 1.30c; plow and cultivator, 1.25c to 1.30c; channels, angles,

zees, tees, under 3-inch, 1.35c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0,10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 60 per cent in carloads, and 55 per cent in less than carloads, delivered in base territory. Planished and machine straightened tire is 1.40c base; iron finished tire under 1½ by 1½ inches, 1.35c, both plus ½ extra on tire card; iron finished tire, 1½ x ½ and over, 1.20c, plus ½ extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch and thicker, we quote base prices for 100 pounds, $3.05 on hard, and $3.30 on soft.

Structural Material. — While the structural bookings over the first half in point of tonnage were heavy, the fact is that most of the contracting is normally done in this period and it does not necessarily follow equal activity will prevail over the last half. It is estimated that the first half lettings were at the rate of about 80 per cent of a normal year. The outlook for the future is however quite promising. Present inquiry is only fair. The Jones & Laughlin Steel Co. is now asking 1.40c Pittsburg on shapes and other principal makers are quoting 1.35c Pittsburg. Bids have been taken for the fabrication and erection of about 7,000 tons of steel for the open-hearth furnace buildings for the new plant of the Jones & Laughlin Steel Co., at Aliquippa, Pa. This company is now fabricating itself about 4,000 tons for its new tin plate mill buildings and will let a number of steel contracts to outside interests. The United Engineering & Foundry Co., Pittsburg, has taken the contract for a number of lock gates for the Panama canal which will require about 1,600 tons of structural steel and 375 tons of nickel steel. The Carnegie Steel Co. will furnish 1.500 tons for a new office and business building which H. C. Frick will erect at East Liberty, Pittsburg. The Jones & Laughlin Steel Co., through the Stone & Webster Engineering Co., Boston, has been awarded the contract for from 600 to 800 tons of steel piling for dam work in connection with an irrigation and power plant to be built by the United Missouri River Power Co., at Helena, Mont. The American Bridge Co. has taken 125 tons for the remodeling of the Rosenbaum building, Pittsburg. We quote the present market on structural shapes as follows:

Beams and channels, 15-inch and under, 1.35c to 1.40c; over 15 inches, 1.45c to 1.50c; zees, 1.35c to 1.40c; tees, 1.35c to 1.40c; angles, from 3 to 6 inches, 1.35c to 1.40c; over 6 inches, 1.45c to 1.50c; universal and sheared plates, 6¼ inches wide and wider, 1.35c to 1.40c.

Merchant Pipe.—Several large pipe line projects, including those of the Pure Oil Co., for from 300 to 400 miles of 8-inch pipe for Illinois and of Standard Oil interests for a gas line of 200 to 300 miles in length from West Virginia to Baltimore, are showing more life, and it is not unlikely that these will soon be placed. The Union Petroleum Co. of Buffalo is also planning a steel line which will require about 60 miles of 8 and 10-inch. Spang, Chalfant & Co., Inc., Pittsburg, took the recent order placed by the Philadelphia company for about 12 miles of 20-inch steel pipe. The entire market is active and much business is being taken. Deliveries are less prompt and with some independent interests range from two to three weeks where shipments cannot be made from stock. The recent advance reported of from $2 to $4 in iron pipe has been made general among the leading makers of this grade. Quotations on merchant steel pipe are regular. We quote the following official discounts on merchant pipe subject to an additional one point and five off to jobbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch	72	56	67	..
⅜ inch	73	59	68	54
½ inch	76	64	71	59
¾ to 6 inch	80	70	75	65
7 to 12 inch	75	60	70	53
PLUGGED AND REAMED.				
1 to 4 inch	78	68	73	63
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	65	53	60	48
½ to 4 inch	72	60	57	55
4½ to 8 inch	68	56	63	51
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inch	61	50	56	45

Boiler Tubes.—Improvement in the boiler tube market is slow. This product is usually one of the last to move in a trade revival and makers are not booking any considerable tonnage. Prices are not firm. We quote the following official discounts on lap-welded steel boiler tubes to jobbers in carloads:

1 to 1½ inch	50
1¾ to 2¼ inch	62
2½ inch	64
2¾ to 5 inch	70
6 to 13 inch	62

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lenghts, f. o. b. Pittsburg.

We quote the folowing official discounts on charcoal iron tubes to jobbers:

1 to 1½ inch	45
1¾ to 2¼ inch	45
2½ inch	50
2¾ to 5 inch	57
6 to 13 inch	45

Wire Products.—The specifications from consumers which were entered at the low prices in May have been worked off, and considerable new business for nearby shipment is being taken at current quotations. Orders are so heavy that in some products, particularly those going to the manufacturing trade, the mills are distributing their tonnage where it is most needed. On contracts up to Jan. 1, premiums of $2 a ton are being asked. The American Steel & Wire Co. is running its finishing capacity in this district at practically 100 per cent. Wire prices are firm and we quote the present market as follows:

Wire nails, jobbers' carload lots, $1.70; retailers' carload lots, $1.75; painted barb wire, jobbers' carload lots, $1.70; retailers' carload lots, $1.75, with 30c for galvanizing; plain wire to jobbers in carloads, $1.50, and to retailers in carloads, $1.55; polished staples, $1.70; galvanized staples, $2.

Wire Rods.—Prices in rods are stronger, but new business is not heavy, as consumers are well covered. We quote present prices at $29 Pittsburg on Bessemer and $30 Pittsburg on open-hearth rods.

Coke.—The labor situation in some districts of the coke region has not shown much improvement. While there appears to be a sufficient force of operatives in the general region, this is not well distributed and where some plants are finding difficulty in maintaining forces, others are not being affected in the least. The steamship companies are bringing back many foreign workmen who had left the country during the depression. The coke market is rather quiet, although considerable foundry material is being sold. Where companies have indicated a desire to withdraw quotations, there has been a lively acceptance of outstanding offers, one interest having taken on about 20,000 tons in the week. Some companies are now quoting a minimum of $2.25 ovens for first class foundry coke, but contracting is general below this figure. We quote spot furnace coke at from $1.50 to $1.60 ovens and on contract from $1.60 to $1.75 ovens according to grade. On first class Connellsville foundry coke the range is from $1.80 to $2 ovens for prompt shipment and on contract from $1.90 to $2.25 ovens. The *Courier's* figures of production for the week ending July 3 show 28,777 ovens active with an output of 324,181 tons compared with 28,665 ovens and a production of 320,634 tons the preceding week.

Old Material.—The old material

market is holding quiet but firm. Some activity in sheet scrap has been injected into an otherwise dull situation by dealers bidding for last half tonnages for the sheet and tin plate mills. As high as $14.25 mill has been paid for this grade. Accumulations of old material generally are in strong hands and comparatively little scrap is being forced for sale. In wrought scrap some of the mills have been bidding direct at slightly higher prices. The Pennsylvania railroad closed this week upon its accumulation and will make awards Thursday. We quote gross tons delivered in the Pittsburg district as follows:

Heavy melting scrap, $15.50 to $16; re-rolling rails, $16 to $16.50; bundled sheet scrap, $13.75 to $14.25; iron axles, $22 to $23; old iron rails, $18.50 to $19; No. 1 wrought scrap, $15.75 to $16.25; old car wheels, $15.50 to $16; low phosphorus, $19 to $20; machine shop turnings, $11.25 to $11.75; cast borings, $9.25 to $9.75; No. 1 cast scrap, $15 to $15.50; malleable, $15 to $15.50; stove plate, $11.50 to $12.

CLEVELAND.

Some Companies Having Trouble in Delivering on Contracts.

Office of THE IRON TRADE REVIEW, Browning Building, July 13.

Iron Ore.—The outlook for the ore market is most gratifying, as a number of additional sales of good size have been made and many inquiries are pending. It now seems probable that the total sales will considerably exceed early estimates.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, 3.50.

Pig Iron.—Inquiries are numerous and more than 5,000 tons of foundry grades have been sold in the city during the week. Prices for local delivery for the last half are unchanged. Some inquiries for round tonnages for first half of next year are pending, and while a little business has been done on the basis of $15.50 at the furnace for No. 2, some valley interests are asking $16, and sales are not numerous. We quote delivered in Cleveland as follows:

No. 1 foundry	$16.00 to 16.25
No. 2 foundry	15.50 to 15.75
No. 3 foundry	15.00 to 15.25
No. 2 southern	15.85
Gray forge	14.90 to 15.00
Bessemer	16.00 to 16.15
Lake Superior charcoal	19.00 to 19.50
Jackson Co. 8 per cent silvery	20.05

Coke.—Furnaces are showing more interest in the coke market, but there is very little contracting, as buyers and sellers found it difficult to reconcile their views as to prices. We quote spot furnace coke at $1.60 to $1.65 at the ovens, and on contract $1.80 to $1.85. For first class Connellsvile foundry coke we quote $1.80 to $2 for spot, and $2 to $2.25 on contract.

Finished Materials. — A few companies are having considerable difficulty in making delivery on contracts made some time ago. One concern purchased from another company 5,000 tons of bars, but when the specifications were received they proved not to be satisfactory on a large part of the tonnage, which was accordingly refused. While the leading interest continues to quote steel bars at 1.25c Pittsburg, and plates and shapes at 1.35c, independents generally are quoting bars 1.30c and plates and shapes at 1.40c. Inquiries from fabricating and erecting concerns for 1,000 tons of structural material for the last half of the year, and 5,000 tons for next year, are pending, but mills are showing very little inclination to make contracts and some of them are positively refusing to do so. Jobbers are enjoying excellent business. Although prices from store on nearly all products have been advanced $2 per ton since July 1, business continues at a very satisfactory rate. One large jobbing house reports that its business for June was the best of any month for 20 months, and July promises to surpass June. Present prices of mills to jobbers will not hold after July 15. The demand for bar iron has improved to such an extent that although it was announced two weeks ago that both the Empire and Union mills would be idle throughout July, it has now been decided to resume at the Empire next Monday, and the Union will probably resume two weeks later.

Old Material.—The general tone of the market continues firm, and prospects are that another week will bring sharp advance in prices. No changes in prices were noted this week, and comparatively little of the material changed hands. We continue to quote f. o. b. Cleveland, as follows:

Old iron rails	$16.50 to 17.00
Old steel rails (re-rolling)	15.00 to 15.50
Old steel rails (under 6 feet)	15.00 to 15.50
Old car wheels	15.50 to 16.00
Old steel boiler plate	12.25 to 12.75
Mallable iron (railroad)	14.00 to 14.50
Steel axles	18.00 to 18.50
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	14.00 to 14.50
Country mixed steel	12.50 to 13.00
Low phosphorus	16.00 to 16.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$14.00 to 14.50
No. 1 busheling	12.00 to 12.50
No. 1 machine cast	12.50 to 13.00
Iron axles	17.50 to 18.00
Axle turnings	10.00 to 10.50
Machine shop turnings	8.50 to 9.00
Grate bars	11.00 to 11.50
Pipes and flues	11.50 to 12.00
Tank iron	10.00 to 10.50
Hoop and band iron	9.00 to 9.50
Sheet iron	8.00 to 8.50
Wrought drilling	8.50 to 9.00
Stove plate	11.00 to 11.50
Cast borings	7.50 to 8.00

CINCINNATI.

Recent Advances in Prices Result in Buyers Staying Out of Market.

Office of THE IRON TRADE REVIEW, First National Bank Building, July 13.

Pig Iron.—Southern pig iron appears to be established on a basis of $12.50 Birmingham for No. 2 foundry. Some small sales have been made at this price and several transactions running up to 500 tons have brought this figure. The asking price for fourth quarter delivery is mainly $13 Birmingham and it is doubtful if this can be shaded at this time. Northern iron remains quotable at $14.50 Ironton for malleable and No. 2 foundry f. o. b. furnace. Northern iron is relatively cheaper, therefore, to consumers than southern iron in most of the territory north of the Ohio river. Inquiry is light, the only important tonnage pending being 2,000 tons of malleable wanted by a large car manufacturer. There is very little inquiry for southern iron. Consumers appear to be taking their iron readily on third quarter contracts and shipments are good. Consumption is improving in this territory. Traveling men report consumers mostly covered for third quarter and a large number for the remainder of the year. There is very little demand for spot iron. Consumers show a willingness to entertain propositions for 1910 deliveries over the first quarter, but furnaces are not quoting. At the present difference in price, northern iron has the preference in this market, although sales agencies state that they have offers at $12 Birmingham for southern iron and could place a liberal tonnage at that figure if a furnace company would be found willing to take the business. The sudden advance in prices for southern iron has apparently had the effect of causing consumers uncovered for the last half to stay out of the market for the present, but southern interests are apparently firm in their views and while the market is quiet, a strong tone prevails. We quote for third quarter delivery and prompt shipment, delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, as follows:

Southern foundry No. 1	$16.25
Southern foundry No. 2	15.75
Southern foundry No. 3	15.25
Southern foundry No. 4	14.75
Southern No. 1 soft	16.25

Southern No. 2 soft	15.75
Southern gray forge	13.75 to 14.25
Northern No. 1 foundry	16.20
Northern No. 2 foundry	15.70
Northern No. 3 foundry	15.20
Jackson county 6 per cent silicon	18.70
Jackson county 8 per cent silicon	19.70
Jackson county 10 per cent silicon	20.70

Finished Material.—Consumers are fairly well covered by contracts and specifications are good. One of the large interests is slightly behind on shipments for bar iron. Prices are firm with no change in the recent schedules. Some good bolt orders have been taken during the week. The jobbing demand is fair.

Coke.—The market is featureless with no change in prices. A few foundries are still contracting, but there is very little demand for furnace coke. The following quotations represent the range in prices in the leading coke producing districts; the inside figures are for prompt shipment and the outside quotations represent the asking prices on long-time contracts.

	Per Ton.
Wise county furnace coke	$1.60 to 1.85
Wise county foundry coke	2.00 to 2.25
Pocahontas furnace coke	1.65 to 1.85
Pocahontas foundry coke	1.75 to 2.25
Standard Connellsville furnace coke	1.60 to 2.00
Standard Connellsville foundry coke	2.00 to 2.25

Old Material.—An easy tone prevails and the market is quiet. Quotations remain about the same as a week ago. It is reported here that a large scrap dealer has purchased 2,700 freight cars from the C. & O. railway. Dealers' prices to consumers in this market are as follows:

Old No. 1 R. R. wrought net tons	$13.50 to 14.00
No. 1 machinery, net tons	13.00 to 13.50
Old iron rails, gross tons	15.00 to 16.00
Old steel rails (re-rolling) gross tons	14.00 to 14.50
Old short lengths, gross tons	13.50 to 14.00
Old iron axles, net tons	17.00 to 17.50
Heavy melting scrap, gross tons	13.00 to 13.50
Stove plate, net tons	10.50 to 11.00
Heavy turnings, net	9.50 to 10.00
Cast borings, net tons	7.50 to 8.00
Car wheels	14.00 to 14.50

NEW YORK.

Important Lots of Pig Iron Being Figured On—Fewer Structural Bookings.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., July 13.

Pig Iron.—On the surface, the situation in this district and New England appears considerably less active, but it develops that selling interests here and there are now figuring on a relatively large tonnage of inquiry privately circulated. This includes several important lots of foundry iron, notably one of close to 10,000 tons for the Canadian branch of a large American concern, a lot of from 500 to 1,000 tons of charcoal iron for the New England shipment, several blocks of pipe iron and some basic and malleable Bessemer. Sales of the past week have included nothing noteworthy, although several lots ranged from 500 to 1,000 tons and a Virginia interest sold a 2,000-ton block of high silicon product for western delivery. So far as prices are concerned, the situation seems stronger than was reported a week ago. Sales of Buffalo iron at $15.25, furnace, for No. 2X, are reported and this is apparently the minimum. The advance of southern iron to a $12.50 basis has cut that district out of the northern market for the time being, but the advance is being strictly adhered to. Virginia makers have stiffened up a bit and $14, furnace, is the lowest price reported in connection with recent sales. Eastern Pennsylvania furnaces are asking $16 to $16.25 for prompt or early delivery iron and sales are being made on this level. There is reason for believing that stocks in the eastern territory are decreasing, as a number of interests are having difficulty in keeping up shipments, and some additional capacity will probably go in at an early date. This is the weakest element in the entire situation, as a heavy idle capacity can be placed in operation on short notice, a development which is likely to come with the next general advance. We note one sale of 1,000 tons of foundry iron for delivery over the first half of 1909, the premium being $1 over current prices. We quote, New York delivery, for third quarter and the remainder of the year, as follows:

Northern foundry No. 1	$17.25 to 17.75
No. 2X foundry	16.75 to 17.25
No. 2 plain	16.25 to 16.50
No. 2 southern foundry	16.75 to 17.25
Malleable	17.25 to 17.75
Gray forge	15.50 to 16.00

Ferro-Alloys.—Ferro-manganese inquiries aggregating perhaps 1,000 tons are in circulation, though sales of the last week have been light. We quote prompt at $41.50, seaboard; last half delivery at $42; and first half, for which considerable metal has been sold, at $42 to $42.50. There has been considerable buying of ferro-silicon during the week, but the chief transaction was of a private nature and no details are available. The price is $61.50 to $62, Pittsburg, for prompt shipment, and $65 to $66 for forward delivery. We note considerable selling of ferro-phosphorus on the basis of $50, furnace, for 20 per cent. A fair tonnage of Bessemer ferro-silicon, 10 to 12 per cent, is coming into this country from Scotland.

Finished Materials.—Current bookings of structural materials in this territory are decidedly less important than for some time past, a condition which is welcomed by most fabricating interests, inasmuch as shops are well filled up for the next two or three months at least. Specifications on old contracts, however, are beginning to come in more freely and structural operations consequently are showing steady improvement. For the most part, fabricated prices are slow to reflect the improvement, but the trend is in the right direction and occasionally a striking instance occurs, as did a few days ago, when an important interest was offered a considerable bonus for early delivery on the steel for a 1,000-ton job. Eventually a shop was found which could accommodate this tonnage immediately, but only after prolonged search.

The bulk of current business is made up of railroad work. The St. Paul has divided 1,050 tons of Iowa bridges between the Fort Pitt Iron Works, which received 350 tons, and the Toledo & Massillon Bridge Co. The Riter-Conley Construction Co. will furnish 1,100 tons for track elevations at Chicago by the Pennsylvania Lines West and the Wisconsin Bridge Co. has booked 600 tons for the Pere Marquette. The Eastern Steel Co. will furnish 1,300 tons of heavy beam work for the postoffice at the Pennsylvania Terminal, the general steel contract for which went to the Pennsylvania Steel Co., and will also furnish 150 tons of floor beams for the South Brooklyn pier, the general contract for which has gone to DeHart & Stafford. The New Haven rail order of 9,000 tons has been divided between the Bethlehem Steel Co., 5,000 tons, and the Pennsylvania Steel Co., 4,000 tons. The latter will furnish 1,500 tons of girder rails for the Boston elevated and 150 tons of T-rails for an industrial road. Better prices are noted in connection with sales of plain material and billets, the latter being extremely scarce. One interest reports sales during the past week as aggregating 1,700 tons, practically all specials. We quote:

Angles, 3 to 6 inches x ¼-inch and heavier, 1.46c to 1.51c; beams, 3 to 15 inches, 1.46c to 1.51c; tees, 3 x ¼-inch and heavier, 1.46c to 1.51c; plates, carloads, tank, 1.46c to 1.51c; marine boiler, 1.86c; bar iron, 1.40c to 1.45c; soft steel bars, 1.36c; sheets, No. 28 black, 2.56c.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. will supply 460 tons of 16-inch for Hoboken, N. J., under a contractor's letting. Braintree, Mass., is in the market for 200 tons of 8-inch. Prices remain exceedingly low but are tending upward.

Old Materials.—The market is in a rather peculiar situation in that holders of important accumulations are not tempted to dispose of any large lots at the prices offered by the mills. Current transactions are so light that de-

pendable quotations are difficult to secure. We note one sale of 500 tons of railroad wrought and a few small transactions in heavy melting steel. Railroad wrought and track scrap are lower. We quote, gross tons, New York delivery, as follows:

Old steel rails (rerolling)	$13.50 to 14.50
Relaying rails	19.00 to 19.50
Old car wheels	14.50 to 15.00
Old iron car axles	20.00 to 20.50
Old steel car axles	18.00 to 18.50
Heavy melting steel	13.00 to 13.50
No. 1 railroad wrought	15.00 to 15.50
Iron track scrap	13.00 to 13.50
Wrought pipe	12.00 to 12.50
Cast borings	7.50 to 8.00
Wrought turnings	9.00 to 9.50
Heavy cast scrap	12.50 to 13.00
Railroad malleable	11.50 to 12.00
Stove plate	10.00 to 10.50
Grate bars	10.00 to 10.50

PHILADELPHIA.

Several Furnaces Behind in Shipments—Billets and Steel Scrap Scarce.

July 13.

Pig Iron. — The strong position into which producing interests were brought by the heavy buying movement of June is holding the market firm despite the comparative inactivity of the present month, when activities are always curtailed by reason of the heat and inventory-taking. Sales of the past week have not been heavy, and it now develops that several of the largest producers are practically out of the market for deliveries some months ahead. Two or three, in particular, are considerably behind on shipments, as little additional capacity has become operative since the spring. During the next few weeks, however, it is expected that one of the Brooks furnaces, the Oxford stack of the Empire Co., a large crane furnace, and probably another of the Wharton stacks will be blown in. Coke prices are higher, and the recent advance in iron prices promises to be eaten up speedily by higher production costs. Foundry sales of the week have included a number of 500-ton lots. The usual basis for standard makes is now $16, furnace, equivalent to $16.75, delivered in this territory, for No. 2, but one or two interests enjoying a lower freight rate are giving their customers the benefit. Basic continues firm at $15.50, delivered, with a good tonnage still under negotiation. Pipe makers are now unable to shade $15.50, delivered, and no large lots are available even at that figure. We quote, eastern Pennsylvania delivery, remainder of the year, as follows:

No. 1X foundry	$17.00 to 17.50
No. 2X foundry	16.50 to 17.00
No. 2 plain	16.00 to 16.50
Standard gray forge	15.25 to 15.75
Basic	15.50
Low phosphorus	19.00 to 20.00
No. 2 Birmingham	15.75 to 16.25
No. 2X Virginia	16.75 to 17.25
No. 2 plain Virginia	16.25 to 16.75

Finished Materials.—With a brisk volume of business developing all the while, the steel trade is steadily assuming a more satisfactory position and, except in rail-making departments, is now on an exceedingly healthy basis. The scarcity of billets has become more acute and, where they can now be obtained in any tonnage, the minimum is now apparently $25 at the mill. Closely affiliated is a growing scarcity of steel scrap, as a result of which a leading eastern steel interest will shortly begin the operation of considerable Bessemer capacity, sending the product directly to its open-hearth department, thus employing pig iron by a sort of duplex process. The Bethlehem Steel Co. is finding its open-hearth capacity inadequate for the needs of its finishing mills. A number of eastern structural shops are booked full for the next three months and fabricated prices are higher. On plain materials there has been quite a general advance to 1.30c, Pittsburg, for bars, and 1.35c for shapes and plates, equivalent to 1.45c and 1.50c, delivered into this territory. Considerable railroad work is coming out. The Reading is now taking prices on the replacement of 14 steel bridges on the Perkimen branch, and within the next few weeks will call for bids on about 8,000 tons for track elevation work on the Richmond division; the last letting by this road, 5,000 tons, went to the American Bridge Co. The city will receive bids up to July 21 on 1,000 tons of track elevation work. The Baltimore & Ohio car inquiry is reported as involving 6,000 in all, 3,500 all steel and 2,500 steel underframes. The Newport News Ship Building Co. has the contract for two 6,000-ton vessels for the Ocean Steamship Co. (Savannah Line) and it is stated that Cambria Steel will be used. Lukens and the Central Iron & Steel Co. shared in the purchases for the boats recently ordered at Sparrows Point. We quote: Plates, 1.45c to 1.55c; shapes, 1.45c to 1.55c; sheets, No. 28, 2.80c; refined bar iron, 1.45c to 1.50c; steel bars, 1.45c to 1.50c.

Old Material.—A few lots of heavy melting steel ranging up to 500 tons have sold during the week at a $16 delivered basis, but efforts to shade this figure have met with little success and brokers are now holding out for higher prices. Railroad offerings of the month are not unusual. Another cargo of San Francisco scrap was received some 10 days ago, making about 8,000 tons so far taken at this port, but some larger consignments are expected shortly. We quote, gross tons, eastern Pennsylvania delivery, as follows:

Old steel rails (rerolling)	$16.75 to 17.25
No. 1 steel scrap	16.00 to 16.50
Old steel axles	20.50 to 21.00
Old iron axles	23.50 to 24.00
Old iron rails	19.00 to 19.50
Old car wheels	15.50 to 16.00
Choice scrap R. R. No. 1 wrought	17.00 to 17.50
No. 1 yard scrap	16.00 to 16.50
Machinery scrap	15.00 to 15.50
Low phosphorus scrap	20.00 to 20.50
Wrought iron pipe	15.50 to 16.00
No. 1 forge fire scrap	13.50 to 14.00
No. 2 forge fire scrap, ordinary	9.50 to 10.00
Wrought turnings	12.50 to 13.00
Axle turnings, heavy	13.00 to 13.50
Cast borings	10.50 to 11.00
Stove plates	12.50 to 13.00

BUFFALO.

Little Activity in Pig Iron, but Prices Are Hardening.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, July 13.

Pig Iron.—There is very little activity in the pig iron market here this week and there are indications that quiet will prevail to some extent for another week or two. Prices are hardening and it is necessary to raise the minimum quotations on No. 2X foundry and several other grades this week. Gray forge is practically out of the market at this point. The demand for the principal grades of foundry iron is light, but there is a considerable number of fairly important interests whose wants are not covered for the last half and inquiries for forward delivery iron from this source are straggling in. Shipments this week include small tonnage. In the following quotations it may be found that for certain grades, prompt delivery, a price of 25 cents less than minimum given, might be had, but in rare cases. We quote f. o. b. Buffalo, as follows:

No. 1X foundry	$15.50 to 16.00
No. 2X foundry	15.00 to 15.75
No. 2 plain	14.75 to 15.25
No. 3X foundry	14.50 to 15.00
Malleable Bessemer	15.25 to 15.75
Gray forge	14.50 to 15.00
Charcoal	19.50 to 20.50

Finished Products.—Another large interest has gone out of the market so far as concerns quoting on contract business and is known to have declined an order for 750 tons of structural material this week, and another order offered last week for 5,000 tons for export, shipments to be made before Sept. 1. It was also authoritatively reported that the Steel Corporation could only receive current business, the mills being obligated for the remainder of the year. One interest has advanced the price on bars to 1.30c and shapes and plates to 1.40c, both quotations f. o. b. Pittsburg.

ST. LOUIS.

Numerous Sales of Small Quantities of Pig Iron.

July 12.

Pig Iron.—A buying movement for pig iron started in the St. Louis territory last week, and while it did not develop any large orders, quite a tonnage was booked for single car lots of from 100 to 200 tons for shipment over the third and last quarter of the year at prices ranging from $12 to $12.50, Birmingham, for No. 2, and in some instances as high as $12.75 for delivery over the latter part of the year. Inquiries are out for southern iron aggregating 3,500 tons, and one inquiry has been received for 4,000 tons of basic, the latter for delivery over the last four months of 1909. Some of the furnaces are reported to be holding out for $13, Birmingham, for No. 2, for last quarter shipment, and others to have withdrawn from the market. Our quotations, delivered, to which the freight of $3.75 from Birmingham has been added, follow:

No. 1 southern	$16.25 to 16.75
No. 2 southern	15.75 to 16.25
No. 3 southern	15.25 to 15.75
No. 4 southern	14.75 to 15.00

Coke.—The market for coke again manifested a little more strength, with the best-selected 72-hour Connellsville foundry grades ruling at from $2.15 to $2.25, ovens, for immediate delivery and on contract for the remainder of the year. The best-selected 48-hour furnace coke, Connellsville grade, was steady at $1.60 to $2 ovens, with Virginia and West Virginia unchanged in prices. The freight to East St. Louis and St. Louis is $2.80 a ton and $2.70 a ton from the Virginia fields when shipment is destined beyond St. Louis.

Old Material.—Scrap iron quotations are firm as follows:

Cast iron borings, free from foreign material, net tons	$ 5.00 to 5.50
Steel axle turnings, gross tons	11.00 to 12.00
Steel railroad axles, net tons	17.00 to 18.00
Iron railroad axles, net tons	18.50 to 19.50
Miscellaneous steel scrap, gross tons	10.00 to 11.00
Old car wheels, gross tons	15.00 to 15.50
No. 1 railroad cast scrap, net tons	11.00 to 11.50
Heavy machinery cast, net tons	13.00 to 13.50
Stove plate and light cast, net tons	10.00 to 10.50
Sheet iron, net tons, uncut	4.00 to 5.00
No. 1 railroad wrought, net tons	12.00 to 13.00
Railroad malleable, net tons	12.00 to 12.50
Heavy melting steel, net tons	11.00 to 12.00
Relaying rails, net tons	17.00 to 18.00

SEATTLE.

Business Still Lags—Very Little Buying of Pig Iron.

Office of THE IRON TRADE REVIEW,
302 Pioneer Building, July 9.

It cannot be denied that the Pacific coast iron market is exhibiting marked conservatism at present. The pulse of prosperity, so evident in the east, is not yet felt to its full strength in the far west. The first rush of spring is over and general business is quiet. There is no cause for alarm and conditions have not ceased to improve. The improvement is slow, however, and the market is somewhat hesitant. It is not expected that this condition will extend beyond a few weeks.

Pig Iron.—The market is quiet, with practically no buying for extended future delivery. Local stocks are light, Portland stocks are only fair, while San Francisco is still suffering somewhat from an oversupply of iron. The movement of European pig from California to the north coast still continues. The recent advances in southern pig have diminished the interest displayed a few weeks ago in domestic iron. We quote gross tons as follows, foreign iron ex ship Puget Sound or Columbia river, domestic f. o. b. Pacific coast terminals:

English, Cleveland, No. 1, spot	$24,00 to 24.50
English, Cleveland, No. 1, to arrive Sept.	23.00 to 23.50
English, Cleveland No. 1, to arrive Dec.	22.50 to 22.75
Glengarnock, Scotch, to arrive September	25.00
Southern No. 2, domestic	22.50 to 23.00

Merchant Iron.—Conditions remain unsatisfactory from a jobbing standpoint and inquiry reveals the fact that the same situation exists along the whole Pacific coast. California markets are, if anything, more disturbed than those of the north coast. Reports of considerable price cutting are coming from San Francisco; normal quotations on soft steel, f. o. b. San Francisco range from $2.10 to $2.20 per 100 pounds. The tonnage moving is quite satisfactory. We quote base prices per 100 pounds f. o. b. Seattle as follows: Common iron bars, $2.10; soft steel bars, $2.20; machinery steel, $2.70; Norway iron, $3.50; angles, channels, zees and tees, under 3 inches, $2.75.

Sheets.—The movement in sheets is better than in most other products. Sales are averaging about 400 tons a month with little going into stocks. We quote as follows: Blue annealed sheets, No. 12, 2.95c; No. 14, 3c; No. 16, 3.10c; Nos. 22 to 24, 3.55c; No. 28, 3.70c. Galvanized sheets, Nos. 10, 12 and 14, 3.60c; No. 16, 3.70c; Nos. 22 to 24, 4.10c; No. 28, 4.70c.

Coke.—The market is quiet with only fair inquiries from the foundries. There is no European coke in stock on Puget Sound. Local ovens are active. We quote net tons as follows: Wilkeson foundry coke, $6.50 at the mine, $7.30 f. o. b. Seattle; German syndicate coke, to arrive in January, $12.50.

Old Material.—Wrought steel scrap is stagnant. Cast scrap, suitable for general foundry work, has weakened slightly, although dealers are not making any concessions willingly. The demand from the foundries continues good. We quote net tons, f. o. b. Seattle:

Foundry and machinery scrap	18.50 to 20.50
Old car wheels	16.50 to 17.00
Railroad wrought	10.00 to 11.00
Country wrought and busheling	5.00 to 8.00

BIRMINGHAM, ALA.

Prices of Pig Iron Firm and Production Is Increasing.

July 12.

Southern pig iron makers are selling their product about as rapidly as they are making it. Some improvement has taken place in the make in the southern territory already this month, the Woodstock Iron Co. blowing in one of its iron makers at Anniston. Two other furnaces in this district should be in operation before the expiration of the week. The producton of less than 100,000 tons for the month, as recorded during June, will not be seen again in many a day. There is a steady line of inquiries being received in this territory and the quotations have hardened lately to a basis of $12.50 per ton, No. 2 foundry. The furnace companies are not taking any business for delivery during the latter part of the year at that price, there being confidence that the quotations are going to be better than those in effect at present.

The shipments and melt are exceedingly heavy and are causing a reduction in the stocks of iron on furnace yards. An estimate is made that the stock on hand on July 1 amounted to 125,000 tons of which 50,000 tons belonged to the manufacturers. On June 1 stock on hand was estimated at 170,000 tons, of which 90,000 tons belonged to brokers, consumers and speculators. With the small output reported for last month, there had to be considerable iron removed from the yards.

The instructions for preparations for a general resumption of operations at the plants of the Southern Iron & Steel Co., successor to the Southern Steel Co., bankrupt, are being given every attention and this week a good sized force went to work making repairs at the steel rod, wire and nail mills at Ensley, Ala., at the steel plant at Gadsden, Ala., and at other works belonging to the com-

pany. Before fall there will be a full resumption of operations and several thousand men will have been given employment.

The following quotations of old iron material are given:

Old iron rails	$13.00 to 14.00
Old iron axles	13.00 to 14.00
Old steel axles	12.00 to 12.50
Old steel rails	9.00 to 9.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	9.50 to 10.50
No. 1, country	8.00 to 9.00
Old standard car wheels	12.00 to 13.00
Stove plate	8.50 to 9.00
Heavy melting steel	8.50 to 9.00
Old steel boiler plate	7.00 to 7.50
No. 1, machinery	10.50 to 11.00
Cast borings	5.00 to 5.50

CHICAGO.

Harvester Purchase Larger Than at First Announced.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, July 13.

Marked strengthening of all iron and steel products is the principal develoment of the week. Mills are accumulating specifications at a rate that will soon tax their resources to fill, and shipments of coke and pig iron are going out in steadily increasing quantities. There is every indication to prove that the long-heralded turn in business has finally been made, and that henceforth the market will be upward rather than downward. Southern pig iron has advanced 50 cents a ton for fourth quarter deliveries, and so strong is the demand for bars, plates and structurals that the Jones & Laughlin Steel Co. has also advanced its prices $1 a ton on each. The Republic Iron & Steel Co. has also advanced its steel bar schedule to 1.30c Pittsburg, while the Illinois Steel Co. has raised its minimum prices on these products to 1.43c and 1.48c, respectively, which is the same basis on which the other constituent companies of the Steel Corporation are selling. The step does not indicate, however, that the company has returned to the old method of quoting Pittsburg prices plus the freight rate. On the contrary, it will continue to quote prices to conform with local conditions, as announced last week, irrespective of what the Pittsburg basis may be. Rail tonnage has fallen off in the last two weeks, but the local mills have specifications and orders in hand to run on open-hearth rails to September and on Bessemer to December, of this year. There is an active inquiry for bar iron and sheets, and prices on both products may be advanced at an early date. The prospects are that the wire schedule will be raised around Aug. 1. Billets continue very scarce and are increasing in value.

Pig Iron.—Southern furnaces have moved up their prices another notch and are now asking $13 Birmingham for No. 2 foundry for fourth quarter deliveries. One furnace is asking this price for the entire half, but the general price is $12.50 for July to September shipments. Northern iron is unchanged at $16.50 furnace, or $17 Chicago, and any delivery this year can be had at this price. The market is very stiff and has resisted every effort to break these quotations. A case in point is the inquiry one southern interest had for 2,000 tons. The buyer was quoted $12.50 and given 12 hours in which to make up his mind whether he wanted it at that price. Large tonnages do not longer attract furnaces, and anything over 5,000 tons is avoided wherever possible, so confident are sellers that a sharp upward movement is imminent. Contracting in the past week was light owing to the higher prices and firmer market, and an active movement is not now anticipated until after the holidays. It develops that the International Harvester Co. purchased a total of 53,000 tons of iron last week, which with its own output will satisfy its requirements well into 1910. It was in the market again this week for several odd lots for shipment to outlying plants but its main requirements are provided for. As stated last week, 15,000 tons went to southern furnaces at prices ranging from $11.50 to $12 Birmingham, and the balance was placed with local stacks at prices ranging from $16 to $16.25. Some fair malleable orders have been placed this week; there is also a good demand for charcoal iron and a scattering inquiry for basic. We quote Chicago delivery as follows:

Lake Superior charcoal	$19.50 to 20.00
Northern foundry No. 1	17.50
Northern foundry No. 2	17.00
Northern foundry No. 3	16.50
Southern foundry No. 1	17.35
Southern foundry No. 2	16.85
Southern foundry No. 3	16.35
Southern foundry No. 4	15.85
Southern No. 1 soft	17.35
Southern No. 2 soft	16.85
Southern gray forge	15.35
Southern mottled	15.10
Southern silveries, 4 per cent silicon	17.35 to 17.85
Southern silveries, 5 per cent silicon	17.85 to 18.35
Southern silveries, 6 per cent silicon	18.85 to 19.85
Jackson Co. silveries, 6 per cent	19.90
Jackson Co. silveries, 8 per cent	20.90
Jackson Co. silveries, 10 per cent	21.90
Malleable Bessemer	17.00
Standard Bessemer	17.65 to 17.90
Alabama basic	16.85

Billets.—Mills are not anxious for additional tonnage in intermediate steel, and are avoiding whenever possible adding to their present obligatons. Prices are very firm, and $28 base Chicago for forging billets is the lowest price ruling. Rolling billets are also firm at $26 to $26.50 Chicago. Wire rods, Bessemer, $27; open-hearth, $28; chain rods, $27; f. o. b. Pittsburg.

Merchant Bars.—Further advances in steel bars have beeen recorded this week. The Republic Iron & Steel Co. and the Jones & Laughlin Steel Co. have each raised its schedule to the basis of 1.30c Pittsburg. The Illinois Steel Co. has also advanced its prices $1 a ton or to the basis of 1.43c Chicago. Mills are rapidly filling with specifications, and the best delivery obtainable today is 30 to 60 days. Bar iron is also strong, and some mills are insisting on spot delivery when the price of 1.35c Chicago is quoted. For deliveries beyond October, 1.40c is asked. We have revised our prices, and quote for Chicago delivery, as follows:

Bar iron, 1.35c to 1.40c; hard steel bars, 1.25c to 1.30c; soft steel bars and bands, 1.43c to 1.48c, half extras; soft steel angles, less than 3 x 3, 1.48c; hoops, 1.78c base, full extras; planished or smooth finished tire steel, 1.58c; iron finish, up to 1½ x ½-inch, 1.53c base tire card; iron finish, 1½ x ½-inch and larger, 1.38c base steel card; channel for solid rubber tire, ¾ to 1 inch, 1.88c, and 1⅛-inch and larger, 1.78c; smooth-finished machinery steel, 1.63c; flat sleigh shoe, 1.43c; concave and convex sleigh shoe, 1.63c; cutter shoe, 2.75c; toe calk steel, 1.93c; railway spring steel, 1.78c, base vehicle card; crucible, 1.73c, base steel card; vehicle spring tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 60 per cent off the list for carload lots, and 55 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.70c to 1.80c, base, full extras; soft steel bars, 1.50c per 100 pounds base, plus half extras; soft steel hoops, 2.20c, full extras.

Plates.—An advance of $1 a ton has been announced by the Jones & Laughlin Steel Co., placing that company's schedule on the basis of 1.40c Pittsburg. The Illinois Steel Co. has also raised its price $1 a ton, again placing its products on the same basis as the Pittsburg mills of the Steel Corporation, which is 1.35c or 1.53c Chicago. As stated last week, however, it is the company's intention hereafter not to be governed by Pittsburg quotations in soliciting business, but to quote prices best suited in its judgment to local conditions. The specifications for universal plates have greatly improved in the past week, and the local mill now has ample tonnage in

hand. The demand for sheared plates is of an insistent nature and the best delivery obtainable is 30 to 60 days. We quote for Chicago delivery as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.53c to 1.58c. For extras see Pittsburg report. Store quotations are without change, as follows:

Tank steel, ¼-inch and heavier, up to 72 inches wide, 1.70c; from 72 inches wide to 96 inches wide, 1.80c; 3/16-inch up to and including 60 inches wide, 1.80c to 1.85c; 72 inches wide, 2.05c to 2.10c; No. 8 up to 60 inches wide, 1.80c to 1.85c. Flange and head quality, 25c extra.

Sheets.—The plans of Inland Steel Co. for the extension of its sheet mill at Indiana Harbor comprise the installation of eight new hot mills and two cold mills and five galvanizing pots. The present plant consists of 10 hot mills and three galvanizing pots, but it is the ultimate intention to increase the sheet plant to 24 mills. When the present authorized additions are completed, which is expected to be around Jan. 1, the company will have an output of 10,000 tons of sheets monthly, and a galvanizing capacity of 250 tons daily. There is a very strong demand for black, galvanized and roofing sheets, and on the two former products prices are rigidly adhered to. The cutting on roofing material is neither so widespread nor heavy as formerly. September is the best delivery that can be given by the local mill on black sheets.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents. We quote store prices at Chicago as follows:

No. 10, 2c to 2.10c; No. 12, 2.05c to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; Nos. 18-20, 2.50c to 2.55c; Nos. 22-24, 2.55c to 2.60c; No. 26, 2.60c to 2.65c; No. 27, 2.65c to 2.70c; No. 28, 2.75c to 2.80c; No. 30, 3.05c; galvanized sheets, Nos. 10 to 16, 3c to 3.10c; Nos. 18 and 20, 3.05c to 3.15c; Nos. 22 to 24, 3.20c to 3.25c; No. 26, 3.40c to 3.45c; No. 27, 3.60c to 3.65c; No. 28, 3.80c to 3.90c; No. 30, 4.20c to 4.50c.

Structural Steel.—Tonnage in this material continues very active. September is the best delivery that can be given by the local mills, and seven weeks from date is the best that can be done on fabricated material. An advance of $1 a ton has been promulgated by the Jones & Laughlin Steel Co., putting that company's schedule on the basis of 1.40c Pittsburg. The Illinois Steel Co. has also raised its price $1, or to the basis of 1.53c Chicago, which is equivalent to 1.35c Pittsburg. This advance does not indicate the departure of the company from the announced plan of naming its own prices hereafter, as future conditions might justify. Fabricating contracts let in the week under review include the steel for the First National bank, Denver, 1,800 tons. This was awarded to the Minneapolis Steel & Machinery Co. by the general contractors, James Stewart & Sons, St. Louis. The American Bridge Co. secured the contracts for the Bradley building, Duluth, 321 tons, and for the First National bank building, San Jose, Cal., 380 tons. We quote mill prices for structural shapes, Chicago delivery, as follows: Beams and channels, 15-inch and under, 1.53c to 1.58c. For extras, see Pittsburg report. Local store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $1.70 per 100 pounds; angles over 6 inches, $1.80 per 100 pounds base; beams, 3 to 15 inches, inclusive, $1.70 per 100 pounds base; channels, 3 inches and larger, $1.70 per 100 pounds base.

Rails and Track Supplies.—New tonnage in rails this week was light, including about 5,000 tons of open-hearth rails awarded to the Illinois Steel Co. in miscellaneous lots. The local mills are sold to September on open-hearth rails and to December on Bessemer rails. No orders have been booked for 1910 shipment. Light rails are sprightly, and track supplies are in excellent demand.

See Pittsburg report for prices on standard sections. On light rails, Chicago delivery, we quote as follows:

Light rails, 40 and 45-pound, $26; 30 and 35-pound, $26.75; 16, 20 and 25-pound, $27; 12-pound, $28. In lots of 250 to 500 tons a reduction of 60 cents a ton from these prices is made; lots of 500 tons and up carry a reduction of $1 a ton. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.75c to 1.85c; smaller size spikes, 1.85c to 1.95c base; track bolts, with square nuts, 2.15c to 2.20c; with hexagon nuts, 2.30c to 2.40c.

Merchant Pipe and Boiler Tubes.—Demand is increasing, both in the form of new business as well as specifications. Prices are without change. We quote for lap-welded tubes out of store 65 off, and for charcoal 50 off. For mill discounts see Pittsburg report.

Cast Iron Pipe.—The largest contract let in the west this week was 1,000 tons of 30-inch pipe awarded by the city of Sheboygan, Wis., to the United States Cast Iron Pipe & Foundry Co. The United States government is inquiring on 600 tons of pipe for Fort Meade, Sturgis, S. D.; Springfield, O., is also in the market for 200 tons, and Osage, Kans., will let contracts on July 27 for 700 tons. Prices are without change, as follows: Four-inch water pipe, $27.50; 6 to 14 inches, $26.50; larger sizes, $25.50; gas pipe, $1 a ton higher.

Wire Products.—The same excellent condition prevails that has been reported from week to week for the past three months. Tonnage is coming in very satisfactorily for summer months, and dealers are insistent in their demands for shipments. Buying for the fall trade is expected to commence in the south about July 15, and in the northern states about Aug. 1. An advance in the entire wire card is expected in the near future. We quote to jobbers, Chicago delivery, as follows:

Wire nails, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers, less than carload lots, $2.03; painted barb wire, jobbers' carload lots, $1.88; retailers' carload lots, $1.93, with 30c for galvanizing; plain wire to jobbers in carloads, $1.68; staples, $1.88. Wire rods, Bessemer, $27; open-hearth, $28; chain rods, $27; f. o. b. Pittsburg.

Old Material.—The local market is listless in its main characteristics. About the only scrap being dealt in is that which is either on track or in transit. This has to be offered at concessions to escape demurrage charges resulting in perceptible weakness of the entire list. The C., M. & St. P. has a new list out of 2,000 tons. We quote prices as follows, gross tons being in the first paragraph:

Old car wheels	15.50 to 15.75
Old iron rails	17.00 to 17.25
Rerolling rails (4 ft. and over)	15.75 to 16.00
Old steel rails (2 ft. and under)	15.25 to 15.50
Light section relayers, 45 lbs. and under subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards	14.25 to 14.50
Heavy melting steel	14.00 to 14.25

We quote, net tons, as follows:

No. 1 R. R. wrought	$13.25 to 13.50
No. 2 R. R. wrought	12.25 to 12.50
Arch bars and transoms	16.25 to 16.50
Knucklers, couplers and springs	13.25 to 13.50
Shafting	15.25 to 15.50
Iron car axles	18.00 to 18.25
Steel car axles	17.25 to 17.50
Locomotive tires	14.50 to 14.75
Dealers' forge No. 1	10.75 to 11.00
Pipes and flues	9.75 to 10.00
No. 1 cast, 150 lbs. and less	13.50 to 13.75
No. 1 busheling	10.75 to 11.00
No. 2 busheling	8.00 to 8.25
No. 1 boiler cut	10.00 to 10.25
Boiler punchings	13.25 to 13.50
Cast borings	6.00 to 6.25
Mixed borings, etc.	6.00 to 6.25
Machine shop turnings	8.00 to 8.25
Railroad malleable	12.75 to 13.00
Agricultural malleable	11.25 to 11.75
Stove plate and light cast scrap	11.50 to 11.75
Angle bars, splices, etc. (iron)	15.75 to 16.00

METAL MARKETS.

ST. LOUIS.

July 12.

Lead and Zinc.—In spite of the fact that the production of zinc and lead ore in the Missouri-Kansas-Oklahoma district fell off to the amount of $100,000 last week, the prices for zinc ore were not as strong as they have been for several weeks past. The best base price reported for 60 per cent ore was $45 a ton, with a high price of $47.50 for mineral of extra choice grade. The curtailed output was due to floods in the district, Fourth of July holiday and heat prostrations among the many horses used by haulers. Many bins of ore sold for $42 base, and when the week closed the market was anything but strong. The reduced price was partly accounted for by a slump in spelter, which was quoted weaker at St. Louis at $5.25.

Calamine continued to range in price from $20 to $24 a ton for 40 per cent ore.

Lead again declined as a consequence of the weakness of St. Louis pig lead, which was quoted at $4.22½ at the close of the week. The best price reported for lead ore was $53 a ton for 80 per cent mineral, with the bulk of lead selling at from $50 to $51 a ton.

NEW YORK.

July 13.

Metal prices at the close of business Tuesday were as follows: Lake copper, 13¼c to 13⅜c; electric copper, 12¾c to 12⅞c; casting copper, 12⅝c to 12¾c; pig tin, 28¾c to 29c; pig lead, 4.32½c to 4.35c; spelter, 5.30c to 5.35c.

CHICAGO.

July 13.

The metal market has been inactive for the past week. There seems to be no depreciation in the consumption, but melters are operating on metal purchased several weeks and longer ago. Prices have slightly receded under this inactivity. We quote Lake copper, carload lots, 13¾c to 14c; casting copper, 13⅛ to 13¼c; smaller lots, ¼c to ¾c higher. Spelter, 5.35c to 5.40c; lead, desilverized, 4.45c to 4.50c in 50-ton lots; corroding, 4.70c to 4.80c in 50-tons lots; car lots, 2½c per 100 pounds higher; sheet zinc, $7 list f. o. b. La Salle in car lots of 600-pound casks; Cookson's antimony, 10½c; other grades, 9¾ to 10¼c.

The demand for old metals remains quiet and the market is inclined to softness. We quote as follows:

Copper wire, 11¾c to 12c; heavy copper, 11½c to 11¾c; light copper, 10¾c to 11c; heavy red brass, 10¾c to 11c; heavy yellow brass, 8½c; light brass, 6¼c; No. 1 red brass borings, 9c to 9¼c; No. 1 yellow brass borings, 7¾c; brass clippings, 8¼c; tea lead, 3.60c; lead scrap, 3.90c; zinc, 3.60c; tin pipe, 24½c; tin foil, 23c; pewter, 17½c; electrotype plates, free from wood, 4c; electrotype dross, 2.90c; stereotype plates, 4½c; stereotype dross, 3c; prime slab zinc dross, $60 per ton.

LABOR UNIONS

Dictate to Public Officials in San Francisco—Litigation Will Follow.

San Francisco, Cal., July 8.—Upon the plea of wanting to patronize home industry, the board of public works yesterday awarded the contract for furnishing gate valves for the auxiliary fire system to the Pelton Water Wheel Co., of this city, at a cost of $398,000, while the Pittsburg Valve, Foundry & Construction Co. offered to furnish the valves for $342,398.50, or $56,000 less than the Pelton company, and the Pittsburg people claim that they offer an article which is worth fully $25,000 more than the one offered by its successful competitor.

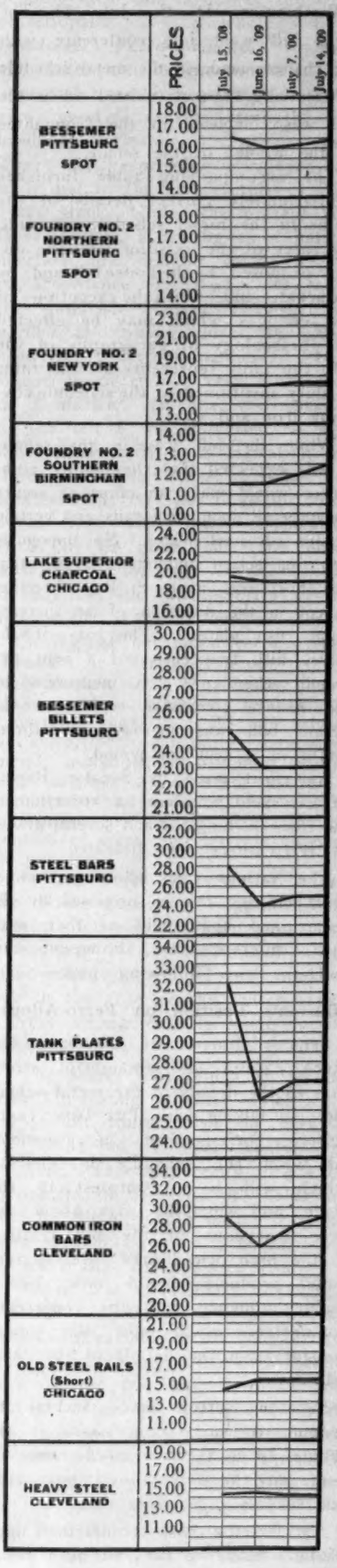
The board of public works yielded to importunities of the labor organizations who pleaded for patronage for home industry, and gave the contract accordingly, irrespective of the charter provision which demands that the award be made to the lowest and best bidder.

At the session of the board and before the award was made, much time was spent in testing the relative merits of the two valves submitted. The engineers reported favorably on both devices.

E. A. Keithley and Roy Pike, representing the Pittsburg company, were thoroughly disgusted at the action of the board of public works, and expressed their indignation freely, threatening to bring action in court to compel the board of works to obey the law and the charter provisions in awarding contracts.

The American Ship Windlass Co. of Providence, R. I., has appointed Walter G. Stephan, mechanical engineer, 1328 Citizens building, Cleveland, as its representative in Northern Ohio for the sale of the Taylor gravity under-feed stoker.

PRICE CHART.



METAL SCHEDULE OF THE DINGLEY LAW, PAYNE BILL AND ALDRICH BILL.

Washington, D. C., July 12.—The tariff bill went into conference with the changes made in the metal schedule substantially as they existed when the bill was completed in the "committee of the whole" of the senate.

The accompanying table furnishes approximately correct details of the items in the metal schedule, showing the rates of the existing law, the duties proposed by the house bill, and by the senate bill. With the exception of few changes which may be effected by phraseology of paragraphs of the bill, the table represents all the rates of duty mentioned in the schedule covering iron and steel.

While the bill was in the senate, it was expected that the finance committee would make an effort to secure an increase upon steel rails and certain grades of steel plates. So unpopular was this action understood to be, that no effort was made in that direction except in the direction of an increase upon "fish plates." The rate of the house bill, two-tenths of a cent per pound, which was left unchanged by the finance committee report on the senate bill, was increased to three-tenths of a cent per pound.

An effort made by Senator Burton of Cleveland to secure a reduction in the rates on tungsten and several grades of ferro-alloys was defeated.

The various rates showing changes from existing law as proposed by the senate and house bills as they went into conference, are shown on this and the two following pages.

Burton's Position on Ferro-Alloys.

Senator Burton of Cleveland has given careful and thoughtful attention to the details of the metal schedule. In talking with THE IRON TRADE REVIEW correspondent, he commented upon the schedule in general, which will be of interest to the trade, and what he says about the new provisions of the bill relating to the high priced ores entering into metal products should have considerable influence with the conference committee, which now has under consideration the details of the tariff bill.

Senator Burton made several attempts to secure concessions in the senate from the increased rates on some of the ferro-alloys, but without success.

Mr. Burton also comments upon changes made in the bill as a result

Article.	Dingley law duty.	House bill. Rate.	Senate bill. Rate.
Iron ore	40c. per ton	Free	25c. per ton
Basic slag	$1 per ton	Free	Free
Pig iron	$4 per ton	$2.50 per ton.	$2.50 per ton
Iron kentledge	$4 per ton	$2.50 per ton.	$2.50 per ton
Spiegeleisen	$4 per ton	$2.50 per ton.	$2.50 per ton
Scrap iron	$4 per ton	50c. per ton.	$2.50 per ton
Scrap steel	$4 per ton	50c. per ton.	$2.50 per ton
Ferro-manganese	$4 per ton	$4 per ton.	$2.50 per ton
Ferro-silicon containing not over 15 per cent silicon	$4 per ton	$4 per ton (par. 182)	$4 per ton (par. 182)
Bar iron, rolled or hammered, comprising:			
Flats not less than 1 inch wide nor less than 3/8 of 1 inch thick	6/10c. per lb.	4/10c. per lb.	3/10c. per lb.
Round iron not less than 7/16 of 1 inch in diameter	6/10c. per lb.	4/10c. per lb.	3/10 c. per lb.
Square iron	6/10c. per lb.	4/10c. per lb.	3/10c. per lb.
Bars or shapes of rolled or hammered iron, n. s. p. f., and round iron in coils or rods less than 7/16 of 1 inch in diam.	8/10c. per lb.	6/10c. per lb.	6/10c. per lb.
Slabs, blooms, loops, or other forms less finished than iron in bars and more advanced than pig, except castings	5/10c. per lb.	4/10c. per lb.	4/10c. per lb.
Bars, blooms, billets, slabs, or loops, in the manufacture of which charcoal is used as fuel.	$12 per ton.	$10 per ton.	$8 per ton
Beams, girders, joists, etc., and all other structural shapes of iron or steel, valued below 9/10c. per lb.	5/10c. per lb.	3/10c. per lb.	3/10c. per lb.
Valued above 9/10c. per lb.	5/10c. per lb.	3/10c. per lb.	4/10c. per lb.
Boiler or other plate iron or steel (except crucible plate steel and saw plates), etc.:			
Valued 1c. per lb. or less	5/10c. per lb.	3/10c. per lb.	3/10c. per lb.
Valued above 1c. and not above 2c. per lb.	6/10c. per lb.	4/10c. per lb.	4/10c. per lb.
Valued above 2c. and not above 4c. per lb.	1c. per lb.	7/10c. per lb.	7/10c. per lb.
Valued above 4c. per lb.	25% ad valorem	20% ad valorem	20% ad valorem
Forgings of iron or steel or combined iron or steel	35% ad valorem	30% ad valorem	30% ad valoren
Hoop, band or scroll iron or steel, n. o. p. f., etc.:			
Not thinner than No. 10 wire gage	5/10c. per lb.	3/10c. per lb.	3/10c. per lb.
Thinner than No. 10 and not thinner than No. 20 wire gage	6/10c. per lb.	4/10c. per lb.	4/10c. per lb.
Thinner than No. 20 wire gage.	8/10c. per lb.	6/10c. per lb.	6/10c. per lb.
Hoop or band iron, or hoop or band steel, flared, splayed, or punched, etc.:			
Not thinner than No. 10 wire gage	6/10c. per lb.	4/10c. per lb.	4/10c. per lb.
Thinner than No. 10 and not thinner than No. 20 wire gage	7/10c. per lb.	5/10c. per lb.	5/10c. per lb.
Thinner than No. 20 wire gage.	9/10c. per lb.	7/10c. per lb.	7/10c. per lb.
Bands or strips of steel, suitable for making band saws:			
Untempered	3c. per lb. & 20%	1 1/2c. per lb. & 20%	2 3/10c. per lb.
Tempered, or tempered and polished	6c. per lb. & 20%	3c. per lb. & 20%	2 7/10c. per lb
Hoop or band iron, or hoop or band steel, cut to lengths, wholly or partly manufactured into hoops or ties, etc., for baling cotton or any other commodity	5/10c. per lb.	3/10c. per lb.	3/10c. per lb.
Bars or rails for railways:			
Iron	7/20c. per lb.	7/40c. per lb.	7/40c. per lb.
Steel	7/20c. per lb.	7/40c. per lb.	7/40c. per lb.
Railway fish plates or splice bars of iron or steel	4/10c. per lb.	2/10c. per lb.	3/10c. per lb.
Sheets of iron or steel, common or black, and skelp iron or steel, valued at 3c. per lb. or less:			
Thinner than No. 10 and not thinner than No. 20 wire gage.	7/10c. per lb.	5/10 c. per lb.	5/10c. per lb.
Thinner than No. 20 and not thinner than No. 25 wire gage.	8/10c. per lb.	6/10c. per lb.	6/10c. per lb.
Thinner than No. 25 and not thinner than No. 32 wire gage.	1 1/10c. per lb.	8/10c. per lb.	8/10c. per lb.
Thinner than No. 32 wire gage.	1 2/10c. per lb.	9/10c. per lb.	9/10c. per lb.
Sheet iron or sheet steel, corrugated or crimped	1 1/10c. per lb.	8/10c. per lb.	8/10c. per lb.
All the foregoing valued at more than 3c. per lb.	45%	30%	30%
Sheets or plates of iron or steel (except tin plates, etc.), galvanized or coated, etc.:			
Thinner than No. 10 and not thinner than No. 20 wire gage.	9/10c. per lb.	7/10c. per lb.	7/10c. per lb.
Thinner than No. 20 and not thinner than No. 25 wire gage.	1c. per lb.	8/10c. per lb.	8/10c. per lb.
Thinner than No. 25 and not thinner than No. 32 wire gage.	1 3/10c. per lb.	1c. per lb.	1c. per lb.
Thinner than No. 32 wire gage.	1 4/10c. per lb.	1 1/10c. per lb.	1 1/10c. per lb.
Sheet iron or sheet steel, corrugated or crimped, galvanized, etc.	1 3/10c. per lb.	1c. per lb.	1c. per lb.

Article.	Dingley law duty.	House bill. Rate.	Senate bill. Rate.
Sheets or plates composed of iron, steel, copper, nickel or other metal, with layers of other metal imposed by forging, etc.	45%	40%	40%
Hoop, band or scroll, iron or steel, galvanized or coated, etc.:			
Not thinner than No. 10 wire gage	7/10c. per lb.	5/10c. per lb.	5/10c. per lb.
Thinner than No. 10 and not thinner than No. 20 wire gage.	8/10c. per lb.	6/10c. per lb.	6/10c. per lb.
Thinner than No. 20 wire gage..	1c. per lb.	8/10c. per lb.	8/10c. per lb.
Sheet iron or sheet steel, polished, planished, or glanced	2c. per lb.	1 3/4c. per lb.	1 1/2c. per lb.
Sheets or plates, pickled or cleaned by acid, etc.:			
Thinner than No. 10 and not thinner than No. 20 wire gage.	9/10c. per lb.	7/10c. per lb.	7/10c. per lb.
Thinner than No. 20 and not thinner than No. 25 wire gage.	1c. per lb.	8/10c. per lb.	8/10c. per lb.
Thinner than No. 25 and not thinner than No. 32 wire gage.	1 3/10c. per lb.	1c. per lb.	1c. per lb.
Thinner than No. 32 wire gage.	1 4/10c. per lb.	1 1/10c. per lb.	1 1/10c. per lb.
Sheets of iron or steel, common or black, etc., cold rolled, smoothed only, not polished:			
Thinner than No. 10 and not thinner than No. 20 wire gage.	9/10c. per lb.	7/10c. per lb.	7/10c. per lb.
Thinner than No. 20 and not thinner than No. 25 wire gage.	1c. per lb.	8/10c. per lb.	8/10c. per lb.
Thinner than No. 25 and not thinner than No. 32 wire gage.	1 3/10c. per lb.	1c. per lb.	1c. per lb.
Thinner than No. 32 wire gage..	1 4/10c. per lb.	1 1/10c. per lb.	1 1/10c. per lb.
Tin plates, terne plates, taggers..	1 1/2c. per lb.	1 2/10c. per lb.	1 2/10c. per lb.
Steel ingots, cogged ingots, blooms and slabs, billets, bars, etc.:			
Valued at 3/4 of 1c per lb. or less	3/10c. per lb.	7/40c. per lb.	7/40c. per lb.
Valued above 3/4 and not above 1 3/10c. per lb	4/10c. per lb.	3/10c. per lb.	3/10c. per lb.
Valued above 1 3/10c. and not above 1 8/10c. per lb	6/10c. per lb.	5/10c. per lb.	5/10c. per lb.
Valued above 1 8/10c. and not above 2 2/10c. per lb	7/10c. per lb.	6/10c. per lb.	6/10c. per lb.
Valued above 2 2/10c. and not above 3c. per lb	9/10c. per lb.	8/10c. per lb.	8/10c. per lb.
Valued above 3c. and not above 4c. per lb.	1 2/10c. per lb.	1 1/10c. per lb.	1 1/10c. per lb.
Valued above 4c. and not above 7c. per lb.	1 3/10c. per lb.	1 2/10c. per lb.	1 2/10c. per lb.
Valued above 7c. and not above 10c. per lb.	2c. per lb.	2c. per lb.	1 9/10c. per lb.
Valued above 10c. and not above 13c. per lb.	2 4/10c. per lb.	2 3/10c. per lb.	2 3/10c. per lb.
Valued above 13c. and not above 16c. per lb.	2 8/10c. per lb.	2 7/10c. per lb.	2 7/10c. per lb.
Valued above 16c. and not above 24c. per lb.	4 7/10c. per lb.	4 6/10c. per lb.	4 6/10c. per lb.
Valued above 24c. and not above 32c. per lb.	4 7/10c. per lb.	15% ad valorem	6c. per lb.
Valued above 32c. and not above 40c. per lb.	4 7/10c. per lb.	15% ad valorem	7c. per lb.
Valued above 40c. per lb	4 7/10c. per lb.	15% ad valorem	20% ad valorem

The provisions in paragraph 129 of the senate bill for steel, valued at more than 24c. per lb., are intended to cover so-called "high-speed steel." which is a new development in the art of steel making since the Dingley law was enacted. The rates are approximately the same ad valorem equivalent as the rest of the paragraph.

Wire rods, etc.:			
Untempered or untreated—			
Valued 4c. or less per lb.	4/10c. per lb.	4/10c. per lb.	3/10c. per lb.
Valued over 4c. per lb.	3/4c. per lb.	3/4c. per lb.	6/10c. per lb.
Tempered or treated or partly manufactured—			
Valued 4c. or less per lb.	9/10c. per lb.	9/10c. per lb.	8/10c. per lb.
Valued over 4c. per lb.	1 1/4c. per lb.	1 1/4c. per lb.	1 1/10c. per lb.
Round or steel wire:			
Valued at 4c. per lb. or less—			
Not smaller than No. 13 wire gage	1 1/4c. per lb.	1c. per lb.	1c. per lb.
Smaller than No. 13 and not smaller than No. 16 wire gage	1 1/2c. per lb.	1 1/4c. per lb.	1 1/4c. per lb.
Smaller than No. 16 wire gage	2c. per lb.	1 1/2c. per lb.	1 3/4c. per lb.
Manufactures of—			
Not smaller than No. 13 wire gage	2 1/2c. per lb.	2 1/4c. per lb.	2 1/4c. per lb.
Smaller than No. 13 and not smaller than No. 16 wire gage	2 3/4c. per lb.	2 1/2c. per lb.	2 1/2c. per lb.
Smaller than No. 16 wire gage	3 1/4c. per lb.	2 3/4c. per lb.	3c. per lb.
Wire of iron or steel, coated with zinc, etc.:			
Not smaller than No. 13 wire gage	1 9/20c. per lb.	1 2/10c. per lb.	1 2/10c. per lb.
Smaller than No. 13 and not smaller than No. 16 wire gage	1 7/10c. per lb.	1 9/20c. per lb.	1 9/20c. per lb.
Smaller than No. 16 wire gage..	2 2/10c. per lb.	1 7/10c. per lb.	1 19/20c. per lb.
Manufactures of—			
Not smaller than No. 13 wire gage	2 7/10c. per lb.	2 9/20c. per lb.	2 9/20c. per lb.

of increased duties upon zinc ore and spelter. He says:

"I regard Paragraph 182 of the pending tariff bill as one of the most objectionable in the whole list of schedules. Ferro-tungsten, titanium and other articles mentioned in the paragraph are increasingly used to give greater tensile strength and hardness or other quality to steel. They are especially employed in tools and in the manufacture of high grade steel. Under the present law, these articles, according to a judicial decision, are dutiable at $4 a ton, in accordance with what is called the similitude clause. They are regarded as coming under the same head with ferro-manganese. Ferro-silicon is, of course, very much used in foundries. In the consideration of the bill I was surprised to note there was very little agitation for lower duties on these articles and whatever efforts I put forth for lower duties met with little co-operation. It is to be noted that the house provision is for only 15 per centum ad valorem on the majority of the articles. It is as follows:

Chrome or chromium metal, ferro-chrome or ferro-chromium, ferro-molybdenum, ferro-phosphorus, ferro-titanium, ferro-tungsten, ferro-silicon, containing more than 15 per centum of silica, ferro-vanadium, manganese metal, molybdenum, titanium, tantalum, tungsten or wolfram metal, 15 per centum ad valorem; ferro-silicon containing not more than 15 per centum of silica, and ferro-manganese, $4 per ton.

"In any event, it is desirable that the house provision relating to all except ferrosilicon containing not more than 15 per centum of silicon should be adopted. I am frank to say in the case of this latter article a very strong case is made for an increased duty.

"The senate also added an amendment providing a duty (Paragraph 187½) on tungsten-bearing ores of all kinds of 15 per centum ad valorem. This may result in the development of domestic ore fields and thereby diminish the cost. It would have seemed, however, a better policy to leave that on the free list.

"There was a manifest disposition, especially in the senate, to increase duties on certain forms of raw material; for instance, zinc ore, heretofore on the free list, is made dutiable at 1 per cent per pound on the zinc contents containing 25 per cent of zinc or more. The ore containing less than 10 per cent is free; containing more than 10 per cent and less than 20 per cent, one-quarter of a cent on the zinc contained therein;

20 per cent of zinc and less than 25, one-half a cent. This lower grade of ores will probably not be used at all in the making of spelter. In any event, the duty seems an injudicious one because the price has doubled in the last 12 years and the domestic mines are insufficient to equal the demand. Ore of an inferior quality is imported simply because it is necessary to keep the smelters running to supply the demand.

"This new duty on zinc ore makes necessary an increased duty on galvanized sheet steel, the differential on which has been raised from 0.2 to 0.3 of a cent per pound, at least in the senate bill, and it is probable that the house will concur."

ARTHUR J. DODGE.

Article.	Dingley law duty.	House bill. Rate.	Senate bill. Rate.
Smaller than No. 13 and not smaller than No. 16 wire gage	2 19/20c. per lb.	2 7/10c. per lb.	2 7/10c. per lb.
Smaller than No. 16 wire gage	3 9/20c. per lb.	2 19/20c. per lb.	3 2/10c. per lb.
Steel in strips, flat wire, and all wire n. s. p. f., valued more than 4c. per lb.	45%	45%	40%
Do. (manufactures of)	45% plus 1 1/4c. per lb.	45% plus 1 1/4c. per lb.	40% plus 1 1/4c. per lb.
Do. (coated with zinc or tin, etc.)	45¾ plus 2/10c. per lb.	45% plus 2/10c. per lb.	40% plus 2/10c. per lb.
Do. (coated with zinc or tin, etc., manufacture of)	45% and 1 9/20c. per lb.	45% plus 1 9/20c. per lb.	40% plus 1 9/20c. per lb.
Wire rope and wire strand:			
Made of iron and steel wire—			
Not smaller than No. 13 wire gage	2 1/4c. per lb.	2c. per lb.	1 3/4c. per lb.
Smaller than No. 13 and not smaller than No. 16 wire gage	2 1/2c. per lb.	2 1/4c. per lb.	2c. per lb.
Smaller than No. 16 wire gage	3c. per lb.	2 1/2c. per lb.	2 1/2c. per lb.
All valued more than 4c. per lb.	40% plus 1c. per lb.	40% plus 1c. per lb.	40% plus 3/4c. per lb.
All valued more than 4c. per lb. n. s. p. f.	45% plus 1c. per lb.	40% plus 1c. per lb.	40% plus 3/4c. per lb.
Made of iron or steel wire, coated with zinc, etc.:			
Not smaller than No. 13 wire gage	2 9/20c. per lb.	2 2/10c per lb.	1 19/20c. per lb.
Smaller than No. 13 and not smaller than No. 16 wire gage	2 7/10c. per lb.	2 9/10c per lb.	2 2/10c. per lb.
Smaller than No. 16 wire gage	3 2/10c. per lb.	2 7/10c. per lb.	2 7/10c. per lb.
All valued more than 4c. per lb.	40% plus 1 2/10c per lb.	40% plus 1 2/10c per lb.	40% plus 19/20c. per lb.
Bars or rods, polished or planished in addition to process of hot rolling or hammering	1/4c. per lb. extra	1/8c. per lb. extra	1/8c. per lb. extra
Sheets, strips, plates, polished or planished in addition to process of hot rolling or hammering	1c. per lb. extra	5/10c per lb. extra	4/10c. per lb. extra
Circular saw plates	1/2c. per lb. extra	1/2c. per lb. extra	1/4c. per lb. extra
Axles, or parts of, axle bars, etc.	1c. per lb.	1c. per lb.	3/4c. per lb.
Bolts, etc.	1 1/2c. per lb.	1 1/4c. per lb.	1 1/8c. per lb.
Lap-welded, butt-welded, seamed or jointed iron or steel tubes, pipes, flues, or stays, not thinner than No. 16 wire gage:			
Not less than 3/8 inch in diam.	2c. per lb.	1c. per lb.	1c. per lb.
Less than 3/8 inch and not less than 1/4 inch in diam.	2c. per lb.	1 1/2c. per lb.	1 3/4c. per lb.
Less than 1/4 inch in diam.	2c. per lb.	2c. per lb.	2c. per lb.
Cylindrical or tubular tanks, etc.	45% ad valorem	30% ad valorem	30% ad valorem
Flexible metal tubing, or hose, n. s. p. f.	35% ad valorem (new)	30% ad valorem	30% ad valorem
Welded cylindrical furnaces made from plate metal	2 1/2c. per lb.	2c per lb.	2c. per lb.
All other tubes finished, n. o. p.	35% ad valorem	35% ad valorem	30% ad valorem
Nails, spikes and tacks:			
Nails and spikes, cut, of iron and steel	6/10c. per lb.	5/10c. per lb.	4/10c. per lb.
Nails, horseshoe, hob, and all other wrought iron or steel nails, n. s. p. f.	2 1/4c. per lb.	1 1/2c. per lb.	1/2c. per lb.
Nails, wire, made of wrought iron or steel—			
Not less than 1 inch in length and not lighter than No. 16 wire gage	1/2c. per lb.	1/4c. per lb.	1/2c. per lb.
Less than 1 inch in length and lighter than No. 16 wire gage	1c. per lb.	1/2c. per lb.	3/4c. per lb.
Spikes of wrought iron or steel	1c. per lb.	1/2c. per lb.	3/4c. per lb.
Nuts and washers, of wrought iron or steel	1c. per lb.	1/2c. per lb.	3/4c. per lb.
Horse, mule, or ox shoes, of wrought iron or steel	1c. per lb.	1/2c. per lb.	3/4c. per lb.
Tacks, brads, or sprigs, cut—			
Not exceeding 16 ounces to the thousand	1 1/4c. per 1,000	5/8c. per 1,000	5/8c. per 1,000
Exceeding 16 ounces to the thousand	1 1/2c. per lb.	3/4c. per lb.	3/4c. per lb.
Rivets, of iron or steel	2c. per lb.	1 1/4c. per lb.	1 1/4c. per lb.
Wheels, or parts of, etc.	1 1/2c. per lb.	1 1/4c. per lb.	1 1/4c. per lb.
Ingots, etc., for railway wheels or tires, etc.	1 1/4c. per lb.	1c. per lb.	1c. per lb.

Paragraph 182.—"New-chrome or chromium metal, ferrochrome or ferrochromium, ferromolybdenum, ferrophosphorus, ferrotitanium, ferrotungsten, ferrosilicon containing more than 15 per cent of silicon, ferrovanadium, molybdenum, titanium, tantalum, tungsten, or wolfram metal, valued at $200 per ton or less, 25 per cent ad valorem; valued at more than $200 per ton, 20 per cent ad valorem; ferrosilicon, valued at not exceeding $90 per ton or containing not more than 15 per cent of silicon, $6 per ton.

MINE EQUIPMENT ORDERED.

The Pittsburg-Buffalo Co. has just placed contracts for a large assortment of mechanical equipment for its different mines at its extensive coal plant at Marianna, Pa. The H. K. Porter Locomotive Co., Pittsburg, has been awarded the order for 20 7-ton air locomotives; the S. Jarvis Adams Co., Pittsburg, 2,000 sets of roller bearing car wheels and axles; Jeffrey Mfg. Co., Columbus, O., picking table and 20 air compressors; Phillips Mine & Mill Supply Co., Pittsburg, tipple and mine car equipment; Ingersoll-Rand Co. and Geo. D. Whitcomb, Pittsburg, punching machines; the C. A. Turner Co., Pittsburg, 25 miles of iron line pipe up to 10 inches and the Mesta Machine Co., Pittsburg, two low pressure air compressors. The Mesta company will also furnish the engines for driving what it is said will be the largest air fan ever installed in any mine in the United States or Europe. This fan will be 35 feet in diameter and will have a capacity of 1,200,000 cubic feet per minute. The Mesta company is now building a large hoisting machine for the Marianna plant.

Domhoff & Joyce Agencies.—The Domhoff & Joyce Co. with offices at Cincinnati and Chicago, has been appointed exclusive western sales agents for the Globe, Jackson county, O., high silicon silvery iron. The territory in which it has exclusive sale of this iron comprises the state of Illinois and all west and northwest thereof, western Michigan and northwestern Indiana. This company has also been appointed sole agent for the by-product coke made by the Citizens' Gas Co. of Indianapolis. This coke will be both furnace and foundry grades, and will amount to 100,000 tons or more annually. The coal used will be 80 per cent Stonega and 20 per cent Pocahontas, which mixture has been tested and is said to make an excellent coke.

The Sterling Wheelbarrow Co., Milwaukee, Wis., has broken ground at West Allis for a new and larger plant. The company will require several tools for cutting and fabricating of material.

GREAT ORE MOVEMENT

FOR THIS YEAR NOW SEEMS ASSURED

And the Prospect for Next Year is Highly Encouraging—Placing of Orders for Big Vessels Expected.

Normal conditions are rapidly being restored in the trade of the lakes and some shippers are predicting that the volume of freight moved will equal that of 1907, which was the record year. There is no question of the ability of the ships and docks to handle it. The record of 1907 may seem a trifle high with the leisurely start, but the fact remains that the movement of ore up to July 1 was within 3,900,000 tons of the corresponding movement for 1907 and with only 60 per cent of the fleet in commission. It will be no trouble whatever to equal the 1907 movement if occasion warrants.

The steel trade is daily growing better. The 1910 furnace capacity of the Steel Corporation will call for an additional consumption of 4,500,000 tons of ore over the 1908 capacity—and in 1907 the Steel Corporation moved 22,500,000 tons of ore. In addition new furnaces are constantly being blown in, so that many shippers are already looking forward to an ore movement of 50,000,000 tons next year. What does this mean? Undoubtedly more ships of the modern type. The Pittsburg Steamship Co. has already ordered two and additional orders are pending. In fact, if anyone desires to build for delivery next season, now is the time to order. Ship plate is beginning to increase in price, though it is still $5 per ton lower than it was a year ago. This means a saving of $25,000 on a modern steamer in material account alone. The price of steel must continue to rise as the demand for it increases—and the steel market at this moment is in a mighty healthy state—and wages must increase as the profit in the commodity increases, so that there is a sensible saving to be made in ordering ships early. Announcements of new orders for next year's delivery may be expected at any time.

The placing of orders for new ships may seem odd when it is admitted that there are more ships in existence than are necessary to care for the business; but it is no longer economy to operate a fair part of the fleet in the ore trade. The revolution has been speedy. A few years ago, say even two, Conneaut was the only port where a modern ship might have dispatch in unloading. Now not only Ashtabula, but Lorain, Buffalo, Cleveland and Fairport are giving Conneaut a close race for record in dispatch. The great ships of the Steel Corporation carry 11,500 tons on present draught and they are handled as easily as the 3,000-ton ship was three years ago. So many of these big carriers handle nothing but ore that they are maneuvered like express trains and conform somewhat to express speed in the transaction of their business. All this has come about very quietly, but it is here and the small ship has no part in it. If a 10,000-ton ship gets under the rigs in the early morning, she is frequently out by noon. The ore trade must inevitably gravitate to the big ship and that is why it is reasonable to expect orders for additional 600-footers.

Were it not for the fact that the coal trade is not normal, better conditions could not be asked than exist on the lakes at present. The coal trade, however, is a disappointment so far. Ore is coming down fast and July will probably be a 6,000,000-ton month. The engineers' strike, while never serious, is growing more impotent every day. The companies that started out with new men aboard their ships on May 1 have not lost a day. The only sufferers have been the owners who held out hoping that their old men would return.

SHEET & TUBE CO.

Will Not Sign Amalgamated Scale—Rough Treatment of Lewis.

Youngstown, O., July 14.—This afternoon, President Campbell, of the Youngstown Sheet & Tube Co., will meet his sheet mill employes and will tell them that his company will have no more to do with the Amalgamated association and its wage scales. If they want to go back to work, their jobs are there for them; if not, the company proposes to get other men. "We have always signed the Amalgamated wage scale, ever since we have been in business," said an official of the company to THE IRON TRADE REVIEW representative, "but we shall do so no more. The American Sheet & Tin Plate Co. has decided to get along without the Amalgamated scales, and we must also. The time was when the Amalgamated set the wage, but now the Corporation is doing it. We must follow. Other important interests are doing so. What can we do? We have now five sheet mills which employ 400 men. We are building eight more, and will then employ 800 or more, so we figure we had better adjust this matter right now and get it off our hands. It may cause us some trouble, but we are determined to win."

The same official stated that the company had signed the iron scale with the Sons of Vulcan, because it wanted to have puddlers who would stand by the company, and the Amalgamated puddlers, of course, would not. The attitude of the employes in the skelp and tube mills remains to be determined. They do not work under a wage scale.

Vice President Lewis, of the Amalgamated, was in Youngstown Sunday night, and related how he had gone to Vandergrift, Pa., which has been non-union since the 1901 strike, and tried to organize the Corporation men into an Amalgamated lodge. They had, he said, turned on him, beaten him until he showed two fine black eyes, and then chased him out of town.

TIN HOUSE MEN STRIKE.

(Special Telegram).

Pittsburg, July 13.—The Tin Plate Workers' International Protective Association of America, composed of tin house employes, has issued a strike order against the organized plants of the American Sheet & Tin Plate Co., effective Thursday midnight, when the annual schedule will have expired. This association has organizations of the tinning workmen in some plants in which the Amalgamated association has had no influence in the hot mills and foundry departments. The scope of the resistance of the men to the open shop order of the American Sheet & Tin Plate Co. will therefore be considerably enlarged.

On No. 2 foundry, $15 at furnace is being done on some current business. A local foundry Tuesday bought 500 tons for the last half at this price.

INDEPENDENTS SIGNING SCALE.

Independent bar iron, sheet and tin plate manufacturers are freely signing the labor scales arranged in conference with the Amalgamated Association of Iron, Steel and Tin Workers. Among the companies which have signed the different scales in addition to the list already published, are the following: Cleveland Hardware Co., Cleveland, O.; Licking Rolling Mill Co., Covington, Ky.; Texas Rolling Mill Co.,

Fort Worth, Tex; Westerman Co., Lockport, N. Y.; Standard Chain Co., Columbus, O.; Lockhart Iron & Steel Co., McKees Rocks, Pa.; Pittsburg Forge & Iron Co., Pittsburg; Wayne Iron Co., Pittsburg; Lake Erie Iron Co., Cleveland; Empire Iron & Steel Co., Cleveland; Union Rolling Mill Co., Cleveland; Highland Iron & Steel Co., Terre Haute, Ind.; National Rolling Mill Co., Vincennes, Ind.; Interstate Iron & Steel Co., East Chicago, Ind.; Ohio Falls Iron Co., New Albany, Ind.; Helmbacher Forge & Rolling Mill Co., St. Louis, and Madison, Ill.; American Car & Foundry Co., Detroit; Ft. Wayne Iron & Steel Co., Ft. Wayne, Ind.; Railway Steel Spring Co., Detroit.

PERSONALS.

W. E. Corey, president of the United States Steel Corporation, returned July 13 from a two months' European trip.

Irvin McDowell has withdrawn from the firm of David Evans & Co., pig iron merchants, Chicago, and has been succeeded by R. A. Ellis.

I. M. Beam Jr., assistant manager of the Northwestern Iron Co., Mayville, Wis., has resigned and will enter business in Milwaukee.

S. Cathcart, of Philadelphia, has been made sales manager of the Holland Mfg. Co., Erie, Pa., and will assume his new duties Aug. 1.

Peter J. McEntee, for many years superintendent of the Solid Steel Casting Co.'s plant at Chester, Pa., has secured a similar position with the Maryland Steel Co. at Sparrow's Point, Md.

R. A. McLellan has been appointed chief engineer of the Irondale Steel Co., Seattle, Wash. Mr. McLellan comes to Seattle from San Francisco and has been recently employed in engineering work in Korea.

Hugh M. Wilson, formerly editor and publisher of the *Railway Age*, will on Aug. 1, become associated with the Barney & Smith Car Co., Dayton, O., of which he has been elected a director and vice president.

Joseph E. Johnston Jr. has been appointed general superintendent of the Thomas division of the Republic Iron & Steel Co., to succeed F. B. Keiser, who recently resigned. The appointment is effective July 15.

J. H. Gilhuly, of San Francisco, Pacific coast representative of the Youngstown Sheet & Tube Co., and other iron and steel companies, is now in the east visiting the plants of the different companies with which he is connected.

Jay J. Keyes has sold his interest in the Standard Wheel Works, Terre Haute, Ind., and has resigned the presidency of the firm. He will be succeeded by Carl Fischer, of Wapakoneta, O., who purchased Mr. Keyes' interest in the firm.

J. A. Johnson, expert cost accountant for the Beloit (Wis.) Iron Works, is devoting several weeks this summer to special study at the University of Wisconsin. Mr. Johnson is taking the course of rapid machine shop practice in the college of engineering.

Joseph H. Williamson, who for many years has been connected with the Manufacturers Advertising Agency of New York, and the Viennot Advertising Agency at Philadelphia, as business manager, has opened an office at 719 Temple Court, New York city, as representative of trade journals.

Lew. T. Powell, for several years connected with the St. Louis sales office of Hickman, Williams & Co., has been appointed manager of the same company's Birmingham (Ala.) office, succeeding Victor S. Paine, who has resigned.

Substantial recognition has come to Harry J. Steinbreder, superintendent of the Sylvan works of the Republic Iron & Steel Co., in promotion to the office of general manager of the works of the company at East Chicago. The transfer becomes effective July 15.

E. H. Gary, chairman of the United States Steel Corporation, accompanied by Mrs. Gary, sailed Tuesday on the Kronprinzessin Cecilie and will spend the next two months on an auto tour of the continent, returning about the middle of September. Accupying a neighboring suite on the same boat were H. G. Dalton, of Pickands, Mather & Co., Cleveland, and Mrs. Dalton.

Sanford B. Belden, of Pittsburg, has been made general sales manager of the Jeffrey Mfg. Co., Columbus, O., succeeding R. G. Hutchins, who recently resigned. Mr. Belden has been manager of sales for all territory east of Columbus, with headquarters at Pittsburg. C. M. Blanchard, who has been associated with Mr. Belden in the Pittsburg office, will take up the latter's work there for the present.

B. V. H. Johnson has resigned as representative of the Scullin-Gallagher Iron & Steel Co. of St. Louis to accept the vice presidency of the Commonwealth Steel Co. The resignation takes effect Aug. 1. Mr. Johnson in 1898 became assistant to Clarence H. Howard, who was at that time secretary and western manager of the Safety Car Heating & Lighting Co., with which company he remained until he accepted a position with the Scullin-Gallagher Iron & Steel Co.

Frank A. Scott during the past week tendered his resignation as one of the receivers of the Municipal Traction Co., Cleveland. Coincident with his resignation, announcement was made of his appointment as secretary-treasurer of the Warner & Swasey Co., Cleveland. Mr. Scott sailed for Europe on the Mauretania, July 14, and will spend several weeks on an automobile tour in England, returning about Sept. 15, to resume the duties of his new office. F. F. Prentiss, president of the Cleveland Twist Drill Co., is also a member of the touring party.

OBITUARY.

Albert G. Souther, president E. E. Souther Iron Co., St. Louis, died at his home, June 26.

J. Frank Hawkins, East Orange, N. J., secretary of the Art Metal Works, of Newark, formerly editor of the *New Jersey Standard*, was killed by falling under the wheels of a train from which he was alighting.

George W. Berkenbush, assistant foreman of the iron foundry of the Cambria Steel Co., was instantly killed July 3. Mr. Berkenbush was standing beside a huge flask, awaiting its removal to another part of the building. The crane hook in the side where Mr. Berkenbush was standing slipped and the flask, weighing hundreds of pounds, fell upon him.

Samuel F. Luty, a well-known iron and steel and industrial writer, died at Pittsburg, July 5, at the age of 49 years. He was born in Allegheny and received his education in the public schools of that city and in the Western University of Pennsylvania. Turning early to newspaper work, he established a record of meritorious service in this line and eventually became connected with a number of the prominent Pittsburg newspapers, specializing upon industrial and labor topics. In 1906 he was made associate editor of the *Industrial World* and was serving in this capacity at the time of his death. Mr. Luty had been in poor health for the past several months. His brother, B. E. V. Luty, is a well known writer on iron and steel topics.

The Pennsylvania railroad has completed construction work on the first two tunnels to be built for trunk line service under the Hudson river at New York. They are 2.6 miles in length, 28 feet in exterior diameter and lined with 2 feet of concrete. The shells are built chiefly of cast iron sections, machined and bolted together, and contain in all 64,265 tons of castings.

AMONG MACHINERY MAKERS.

CLEVELAND.

Benefits of the Industrial Exposition Are Now Being Felt.

Office of THE IRON TRADE REVIEW,
Browning Building, July 6.

The first two weeks in July show a slight let-up in the local machine tool trade. Whether this is due to the "summer slump complaint" is largely a matter of conjecture, although most dealers ascribe it to such. Inquiries continue to come in consistently, although it must be admitted that the majority of orders booked is comparatively small. There are occasional reports of fairly large orders pending, but for some reason or other these are being held up temporarily. Although competition is still sharp, prices are stiffening up, showing that the feeling of optimism prevails in spite of a temporary lull. A fact which goes to show that this feeling is not without some foundation is that the railroads are getting into the market again, reports showing that inquiries from this quarter are stronger every day, and prospects in this line are such as to cause considerable satisfaction on the part of dealers.

In the foundry trade, the demand for malleable castings holds strong, and that for light gray iron is constantly improving. The majority of foundries are running at capacity at present and business in this line is about all that can be expected.

Local dealers are beginning to experience tangible results from the Industrial Exposition, held here last month, and say that they can trace many inquiries directly to this source. This is causing considerable gratification, as it is somewhat unexpected, particularly as regards orders from firms other than local.

The C. O. Bartlett & Snow Co. reports that business is unusually good. Among recent orders booked by this company are the following: Greenville Gravel Co., Greenville, O., two complete plants for crushing, conveying, washing and storing gravel, capacity 1,000 yards per day; Pennsylvania Salt Co., Philadelphia, one conveying outfit; Grasselli Chemical Co., Cleveland, one grading outfit; Hellriegel & Co., Buffalo, one fertilizer dryer; New York Sanitary Utilization Co., New York City, three Peck percolators; Wellman - Seaver - Morgan Co., Cleveland, one coal tar haul outfit; Grand Rapids Muskegon Power Co., Jackson, Mich., one coal storage outfit; Ohio Coal & Iron Co., Dayton, O., coal handling equipment.

The Cleveland Wire Spring Co.'s sheet mill department has been picking up steadily during the past few weeks until now its business is up to the 1907 standard. While the other departments are not quite up to this standard, they are steadily approaching it, and prospects for an exceedingly good year are of the brightest.

The Strong, Carlisle & Hammond Co. reports that sales during the past month are double those during the corresponding period of last year. The demand for machine tools does not seem to be confined to any particular line, but is rather evenly distributed and not so dependent upon the automobile industry as formerly.

The Foos Mfg. Co., Springfield, O., is building an addition which is to be used for the manufacture of grinding plates.

The Lees-Bradner Co. has been formed for the manufacture of a new automatic-gear generator, invented by E. J. Lees. Mr. Lees and H. T. Bradner, composing the company, were formerly connected with the Grant-Lees Machine Co.

The Cleveland Twist Drill Co. has been gradually increasing its equipment for some time past, preparatory to the manufacture of the "Paragon" drill, a new type of drill which will soon be put on the market by this company, and which was first shown to the trade at the Cleveland Industrial Exposition.

The business of the Standard Welding Co., a comparatively new concern, has increased to such an extent within the past year that the company has been forced to build an extension of its plant. The new building will be a one-story structure, 215 x 130 feet in size. Practically the entire equipment has already been contracted for.

MILWAUKEE.

Changes in Worden-Allen Co. Made by Lackawanna Plant Project.

Milwaukee, Wis., July 6.—Structural iron manufacturers are taking extraordinary interest in the announcement that B. L. Worden, president, and his associates in Worden-Allen Co., Port Washington road and Gibson Corners, north of Milwaukee, and a number of other Milwaukee capitalists, have organized the Lackawanna Bridge Co., and will establish at South Buffalo, N. Y., a large plant for the production of bridge and structural steel of all kinds. The enterprise will necessitate the removal of Mr. Worden from Milwaukee to Buffalo. It will become, in fact, an eastern works of the local company.

The Lackawanna company is erecting a large plant on a tract of 20 acres recently acquired in the Buffalo suburb, the main building to be 200 x 400 feet, one story, with a capacity of 40,000 tons annually. It involves an expenditure of about $250,000. The company is capitalized at $500,000. Adam Freiburger, superintendent of the Milwaukee plant of the Worden-Allen Co., will become superintendent of the Buffalo plant. E. W. Krueger, a stockholder in the Worden-Allen Co., will succeed Mr. Worden as general manager in Milwaukee. Mr. Krueger, discussing the Buffalo enterprise, said:

"We have already placed out a four-months' output of the Buffalo plant. The works will have just twice the capacity of the largest structural steel plant in Milwaukee, and more than three times the capacity of the Worden-Allen plant here. Bridge work will be the important product, and with the eastern plant in operation we shall be able to seek contracts in any part of the country."

The Worden-Allen Co. was established in Milwaukee in 1902, and its output today is nearly 400 per cent larger than at the time of its opening.

The Van Brunt Mfg. Co., of Horicon, Wis., maker of harvesting and agricultural tools, has purchased a building site adjoining its plant and will erect an office building. Provision is also made for extensions to the drill and seeder departments.

Allis-Chalmers Co. had an interesting visitor last week. He was Shun Tet Kong, A.M. D., England, member A. I. M. E., of China. Mr. Kong is general manager of the Hunan Imperial Smelting works. He came to place a large machinery order with Allis-Chalmers Co. from the Hunan government, amounting to about $350,000.

The Prescott Co., Menominee, Mich., has been awarded several ex-

cellent saw mill machinery contracts in recent weeks, among them complete equipment for the new Perley Lowe mill at Van's Harbor, Mich., and the Northwestern Cooperage Co., of Gladstone, Mich. Much work is being done for southern hardwood mills.

The Racine Concentrating Mining & Mfg. Co., of Racine, Wis., has shipped its first placer mining machine to San Pedro, N. M., and has started active manufacturing of the invention. The company was recently incorporated and officers are: President, Joseph Orth, Kenosha, Wis.; secretary, Nicholas Gantenbein, Racine; treasurer, John Siepler, Racine.

CINCINNATI

Machinery Dealers and Manufacturers Report Better Tone.

Office of THE IRON TRADE REVIEW,
First National Bank Building, July 13.

There are continued evidences of improvement in the demand for machine tools and machinery of all descriptions. Machinery dealers as well as manufacturers report a better feeling all along the line and sales are more frequent. The shops are gradually adding to their working forces and a few have resumed operations to full time and full force. In the wood working line of machines the improvement is keeping pace with the iron working lines. Foundries are busier and are melting more iron which mainly goes into machine tool castings. There is nothing in the way of particular feature in this general awakening of business and while the shops are still far below normal, the demand is so much better than for the past year the manufacturers are in more cheerful frame of mind. Some of the heavier lines have not participated in the gain, but are waiting with patience, as they are confident that in time the demand will come for their lines. One of the shops will move into larger quarters in the near future, having outgrown the plant which it now occupies.

A statement prepared by Secretary John Manley of the Cincinnati Metal Trades Association, reflects the gradual increase in business, which began about November, 1908. The statement prepared uses as a basis of normal conditions the quarterly period ending with June 15, 1907, and the number of operatives employed at that time as reported by the members of the Association is accepted as 100 per cent. On this basis, the number reported for Sept. 15, 1907, was 97 per cent; on Dec. 15, 1907, 85 per cent; on March 15, 1908, 67 per cent; on June 15, 1908, 56 per cent; Sept. 15, 1908, 53 per cent; Dec. 15, 1908, 56 per cent; March 15, 1909, 62 per cent; June 15, 1909, 65 per cent. This statement is interesting as it reflects the conditions of the number of operatives at present at 65 per cent as compared with 56 per cent of normal a year ago. It is also interesting to note that the percentages given very closely follow the reports as to conditions prevailing given out by the manufacturers. There has been a gradual but steady increase in business since the first of the year.

The quarterly dinner of the Cincinnati Metal Trades Association was held at Laughery Island, on Saturday, July 10, at noon. The island had been secured for Friday afternoon, July 9, and some of the members spent Friday afternoon and evening there. Special arrangements had been made so that the trip to the island, which is about 40 miles down the river, was made in automobiles Saturday morning.

The Motch & Merryweather Machinery Co. is sending out an announcement of the opening of an office in Pittsburg in the Farmers' Bank Building, under the management of James H. Herron.

Henry J. Weber, formerly president of the Weber Foundry Co., has been appointed superintendent of the foundry department of the John B. Morris Foundry Co. George K. Morris, president of the company, left this week for Michigan, and will probably remain away several weeks.

The Hisey-Wolf Machine Co. is runing full time and full force on orders, and reports business in good shape.

The John B. Morris Foundry Co. is receiving orders for lathes and is running five heats per week in its foundry department.

The S. Obermayer Co. notes a decided improvement in the call for foundry supplies and is running full time and full force, and, if orders keep up, will be compelled to run overtime next week.

The Bradford Machine Tool Co. reports business improving at a satisfactory rate under the conditions.

The Cincinnati Pulley Machinery Co. has a very good run of orders in hand for sensitive drills and pulley lathes and the shop is busy.

The American Tool Works Co. is enjoying a good run of business and the shop is running full time.

The indications for an early settlement of the tariff question are expected to serve in promoting the interests of the machine tool manufacturers. A considerable amount of business is pending which prospective customers advise will be placed in the fall of the year.

PITTSBURG.

Numerous Orders Being Placed—Results of Competition Shown.

Office of THE IRON TRADE REVIEW,
510 Park Building, July 13.

Manufacturers of machinery, especially that of the mill type, find the most unsatisfactory feature of the present situation to be the low figures at which some contracts are obliged to be accepted. The various companies are filling their books on orders fairly well, but in the general aggressiveness for business that follows a revival from a period of trade depression, prices have suffered considerably.

Engine builders are figuring upon some large installations in the Pittsburg and surrounding districts for extensive mill improvements that are now being planned. The engine trade has been showing considerable improvement and the market is now quite active.

The various mills which had permitted their roll stocks to be almost exhausted during the period of moderate operations are now ordering freely by reason of their greater manufacturing activities and all the roll foundries are quite busy. Some of the steel foundries in this district which make a specialty of railroad castings report better conditions, considerable work in locomotive frames being current and their operations are now around 70 per cent of capacity.

More orders were entered in June by the Westinghouse Electric & Mfg. Co. than any other month in the history of the company. While the aggregate valuation of the different sales made has been exceeded by several months during the period of the company's greatest manufacturing activity, the individual contracts booked reached a new high mark. The wide scope of buyers among the users of electrical equipment is construed as a very favorable indication of the renewed activity that is showing itself in different lines of manufacture. The June business of the Westinghouse Electric & Mfg. Co. exceeded that of May by 25 per cent. The Westinghouse Air Brake Co., Wilmerding, Pa., has received a large number of orders for brake apparatus and friction draft gear. As an index of the improved conditions at the Union Switch & Signal Co., Swissdale, Pa., this plant is now employing about twice the number of men of a year ago. A large order for railway mo-

tors from the New York Elevated Railroad Co. is noteworthy. Switchboards and auxiliary supplies, amounting approximately to $500,000 have also been ordered by the Pennsylvania Tunnel & Terminal Co. for the New York terminals and tunnels of the Pennsylvania railroad. In line with the encouraging improveemnt noted by the Westinghouse Machine Co., the Philadelphia Rapid Transit Co. has recently placed orders for two steam turbine equipments of 6,000 and 12,000 kilowatts capacity, respectively. The Pennsylvania Tunnel & Terminal Co. operating the Pennsylvania railroad tunnels under New York City and the rivers is installing in its Long Island City power house two Westinghouse turbine-alternator sets of 2,500 kilowatts capacity each for lighting the tunnels and terminals. The alternators will supply three-phase 60-cycle current at 440 volts. The Public Service Corporation of New Jersey has also closed with the Westinghouse Machine Co. for four 13 x 12 inch three-cylinder Westinghouse gas engines which are to be direct connected to Root positive blowers in its Hoboken and Passaic gas plants. The engines are of the vertical type and will develop 90 horsepower each.

The Jones & Laughlin Steel Co. during the past week awarded contracts covering its power requirements for its new tin plate plant to be erected at Aliquippa, Pa. The C. & G. Cooper Co., Mt. Vernon, O., was given the order for a 34 and 60 x 60 inches twin tandem Corliss engine which will drive five hot mills on a side through return cranks. It will be slow running and will develop about 2,500 horsepower. The layout of the new tin plate plant is such that when the additional mills are eventually added as now contemplated, other power units will be required. Another Cooper engine recently ordered by the Jones & Laughlin Steel Co. will be used to drive the Morgan continuous billet mill at the South Side works. The cold rolls of the tin plate mill will be operated by a Corliss steam engine and rope drive to be furnished by the Mesta Machine Co., Pittsburg. This engine will be 30 and 60 x 60 inches of the cross compound type. The rope sheaves on the mill will be three in number, the largest of which will be 26 feet 3 inches in diameter and each will carry 20 2-inch ropes.

The Irondale Steel Co., Irondale, Wash., has been a recent buyer of equipment for finishing mills which it is about to install. The company has closed with the Mesta Machine Co., Pittsburg, for a 22-inch 3-high bar mill which is designed to roll a variety of bar and structural products. The mill will have one stand of 3-high pinions and three stands of 3-high rolls.

Important requirements of heavy mill duty engines are being figured upon by engine builders with various steel companies in the Pittsburg district and contiguous territory, which are necessitated by programs of extensive mill improvements now being planned. Among the notable installations which are to be made soon are those of the Republic Iron & Steel Co. for its new tube mill at Youngstown; the Jones & Laughlin Steel Co. for its Aliquippa works; the Youngstown Sheet & Tube Co. for its new sheet mills at Youngstown and the Carnegie Steel Co. for improvements at Clairton.

The Mesta Machine Co., builder of rolling mill machinery, engines and heavy equipment, with works at West Homestead, Pa., is receiving a steadily increasing volume of orders and is now operating at a very favorable gait. During the depression, the company completed extensive improvements to its plant, so that its former capacity has been greatly enlarged. Among the recent important orders which the company is now working upon are a 400-ton mixer for Worth Bros., Coatesville, Pa.; shear to cut 6 inches square cold steel for the Cincinnati Iron & Steel Co., Cincinnati; shear with high type knife to cut 6½ inches square for the Indiana Steel Co., Gary, Ind., which is a practical duplicate of a shear ordered by the same company some time ago, and a vertical hot billet shear to be driven by 150 horsepower motor for the Cambria Steel Co., Johnstown, Pa. Most of the castings of the latter two shears are of steel. In connection with John Mohr & Sons, Chicago, the Mesta company is also working upon an order for two 400-ton mixers for the Indiana Steel Co., Gary, Ind. The tilting mechanism of these mixers will be operated by an electric motor instead of by hydraulic plunger which has been the usual practice.

The Wheeling Mold & Foundry Co., Wheeling, W. Va., has been awarded the contract for the tables, hot beds, transfers, etc., for the 60-inch universal plate mill at the Gary plant of the Indiana Steel Co. The equipment will follow standard lines.

INDIANAPOLIS.

Number of New Companies Organized—Heating Plant Contract.

Indianapolis, July 12.—The trustees of the Knightstown water and electric light plant, owned by the city, are in the market for two dynamos and other machinery.

The recently organized Crawfordsville Heating Co., at Crawfordsvile has entered into a contract with the Central Engineering Co., of Chicago, to equip its new plant.

Contracts for 16 steel bridges in Spencer county, six in Warrick county, two in Posey county and one in Pike county have been received by the Fort Branch Iron Works owned by Lintz Bros. at Fort Branch.

A contract for the steam heating plant in the new city hall building has been awarded by the board of public works to Kirkhoff Bros. and Co. at approximately $24,000. The company was the third lowest bidder. It was recommended that the bid of the Indiana Engineering Co., the lowest bidder, be rejected, and the company has brought suit to enjoin the signing of the contract with the Kirkhoff Co. The second lowest bidder did not present his bid until two bids had been opened.

The Miles Casting Co. is preparing to build a new plant and probably will be midway between New Albany and Jeffersonville. The company will manufacture steel gears for electric cars, machine tool gears and malleable iron castings. About 150 men will be employed.

August M. Kuhn, a wholesale grocer; John W. Kern, attorney, and Jerome Heriff and Chas. Pigman experienced automobile men and manufacturers, have organized the Indiana Automobile Gas & Machine Co., with a capitalization of $75,000. A plant will be established in Indianapolis for the manufacture of gas engines and machinery.

The Eccentric Wrench Co. was organized a few days ago at Marion with an authorized capitalization of $35,000 and has been incorporated. The principal stockholders and directors are Abram Middleton, E. E. Shockley, W. H. Grew, F. E. Burg and W. H. Mitchell.

The Dunbar Furnace Co., Dunbar, Pa., will increase the capacity of its sand plant Aug. 1 to about 850 tons per day. This sand runs about 99½ per cent pure silica. The company is also installing a large dryer, which will be in operation about Aug. 1. The Dunbar Furnace Co.'s sand plant is one of the most complete in Pennsylvania. It makes sand for glass houses, building supply and steel casting purposes, locomotive and concrete use.

Market Lapses Into Dullness

Domestic markets opened Tuesday, owing to the fact that Monday was a legal holiday, with stocks fairly active and prices firm. This activity was short lived, and in spite of the exceptionally favorable government crop report about the middle of the week, the market failed to respond. The market continued dull through the remainder of the week until the very end, when prices began to become firm and higher, but soon lapsed into dullness. Railroad stocks increased appreciably, while on the other hand, steel was heavy. There was a slight pick-up in trade on Wednesday, in which railroads and steel both advanced. Copper, both foreign and domestic, suffered a decline. The market was listless on Thursday, in spite of the favorable government crop report. Friday brought continued dullness, with prices fairly steady. Copper stocks were weak, with a slight shading for the worse. The tone of the market on Saturday was extremely dull, although prices were steady and firm, averaging higher.

Call money for the week ranged between 2 and 2½ per cent, the market again ruling extremely easy, and 1¾ was the average at which loans were made. Time money during the week was liberally obtainable, although the demand was very moderate. Continued ease in call money was largely accountable for the rather apathetic demand. Exports of gold were $2,995,000, of which $2,985,000 were shipped to Argentina. Bank clearings in the United States for the week, owing to the practical suspension of business on Monday, showed a much smaller total than in any week for several months past, but exceeded the corresponding week last year by 3 per cent. The actual report of clearing house banks showed loans decreased $8,185,800; deposits decreased $4,368,000; surplus increased $6,828,800, and the ratio of reserve 27.4 per cent, an increase of 0.4 per cent. Non-member banks and trust companies showed loans increased $2,720,700; net deposits increased $9,312,000, and the percentage of reserve 19.2, an increase of 0.3. Commercial failures for the week were 196, as against 250 the previous week, and 262 the corresponding week last year. Shares were sold to the number of 2,001,699, compared with 2,224,291 the previous week, and 3,103,400 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $21,807,000, compared with $21,688,000 the previous week and $14,912,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. July 10	Changes in Week	Date Ann.	1909 M't'g.	Stock Outstanding	Basis	Dividend Last Declared	Date Last Div. Pay.
Allis-Chalmers	15	— ⅛	Sept.	2	$19,820,000		.....	.....
Allis-Chalmers, pr	51½	— ¼			16,150,000	7 cum	1¾ Q.	Feb., 1904
American Can	11¼	— ⅛	Feb.	2	41,233,300		.....	.....
American Can, pr	81½	— ¾			41,233,300	7 cum	1¾ Q.	July, 1909
Am. Car & Foundry	57½	.....	June	24	30,000,000		½ Q.	July, 1909
Am. Car.& Fdy., pr	117½	+ ¼			30,000,000	7 n. c.	1¾ Q.	July, 1909
American Loc	60	— ⅛	Oct.	19	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	118½	+ ½			25,000,000	7 cum	1¾ Q.	April, 1909
American Ship	60	+ ¼	Oct.	13	7,600,000	4	1 Q.	June, 1908
American Ship, pr	110	+1			7,900,000	7 n. c.	1¾ Q.	Oct., 1908
Am. Steel Foundries(new)	50⅜	+1¼	Dec.	2	17,184,000		.....	.....
Am. Steel Foundries, pr	47½	.....			17,240,000	6 cum	1	Aug., 1904
Barney & Smith	30	.....	June	1	2,000,000	4	1 Q.	Sept., 1907
Barney & Smith, pr	91	.....			2,500,000	8 cum	2 Q.	June, 1908
Bethlehem Steel	30	— ¾	April	6	14,862,000		.....	.....
Bethlehem Steel, pr	60	—1			14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	41	— ¼	March	16	45,000,000*	3	1½ S. A.	Feb., 1909
Cambria Iron	46¼	.....			8,468,000*	4	2 S. A.	Sept., 1908
Chicago Pneumatic Tool	24¾	.....	Feb.	15	6,145,800	4	1 Q.	Oct., 1907
Colorado Fuel	43⅜	1⅛	Oct.	18	34,235,500		3½	April, 1902
Crucible Steel	83¾	— ¼	Oct.	20	24,578,400		.....	.....
Crucible Steel, pr	72½	+ ½			24,436,500	7 cum	1 Q.	Mar., 1909
Empire Steel	5	—5	April	27	1,254,770		.....	.....
Empire Steel, pr	60	.....			2,500,000	6 cum	3 S. A.	July, 1909
Fay & Egan	90	.....	Feb.	18	1,000,000	7	1¾ Q.	Nov., 1908
Fay & Egan,pr	125	.....			1,000,000	7 cum	1½ Q.	May, 1909
General Electric	163½	— ¾	May	11	65,178,800	8	2 Q.	July, 1909
Harbison-Walker	20	— ½	Jan.	18	18,000,000		½	Oct., 1907
Harbison-Walker, pr	85	.....			9,600,000	6 cum	1½ Q.	April, 1909
International Pump	39¼	— ¼	June	8	17,762,500		1	April, 1905
International Pump, pr	89⅝	+ ⅜			11,350,000	6 cum	1½ Q.	May, 1909
Lackawanna Steel	48	+1	March	10	34,971,400		.....	.....
Lake Sup. Corp	22⅞	— ⅜	Oct.	6	40,000,000		.....	.....
New York Air Brake	87¼	— ¼	June	17	8,012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	100	.....	Feb.	3	8,500,000	3	1½ Q.	June, 1909
Niles-Bement-Pond, pr	100	.....			2,000,000	6 cum	1½ Q.	May, 1909
Otis Elevator Co	56	—1	March	15	6,375,300		1½ S. A.	April, 1909
Otis Elevator Co., pr	99	+1			6,295,000	3 n. c.	1½ Q.	July, 1909
Penn Steel	50	.....	May	10	10,750,000		.....	.....
Penn. Steel, pr	115½	4½			16,500,000	7 n. c.	3¼ S. A.	May, 1909
Pittsburg Coal Co	11⅝	+ ⅛	March	9	28,104,600		.....	Nov., 1906
Pittsburg Coal Co., pr	50	.....			27,071,800	7 c.	1¾	April, 1905
Pressed Steel Car	43¾	— ⅛	Feb.	17	12,500,000		3	Aug., 1904
Pressed Steel Car, pr	106	+1¾			12,500,000	7 n. c.	1¾ Q.	May, 1909
Pullman	188	.....	Nov.	10	100,000,000	8	2 Q.	May, 1909
Railway Stl. Spring	43	—1⅜	March	4	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	104⅞	— ⅛			13,500,000	7 cum	1¾ Q.	July, 1909
Rep. Iron & Steel	31¼	— ⅛	Oct.	20	27,191,000		.....	.....
Rep. Iron & Steel, pr	104½	+ ¼			20,416,900	7 cum	1¾ Q.	July, 1909
Sloss-Sheffield	82¾	—1	March	10	10,000,000	5	1¼ Q.	June, 1909
Sloss-Sheffield, pr	116½	+ ¾			6,700,000	7 n. c.	1¾ Q.	July, 1909
U. S. Pipe & Fdy	30	—3¼	June	23	12,500,000	2	½ Q.	Dec., 1907
U. S. Pipe & Fdy, pr	80	—4¼			12,500,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Steel	68⅞	— ⅜	April	19	508,302,500	2 n. c.	½ Q.	June, 1909
U. S. Steel, pr	125⅜	— ¾			360,281,100	7 cum	1¾ Q.	June, 1909
U. S. Steel, 5s	105⅞	.....			463,798,000	5	5 A.	.....
Va. Iron, Coal & Coke	65	+2	Sept.	21	9,073,680		.....	.....
Westinghouse Elec	84	—1½	June	16	27,173,200	10	2½ Q.	April, 1909
Westinghouse Air Brake	113½	+3½	Oct.	5	14,000,000*		2½ Q.	Oct., 1907

Par value of shares, $100, except those starred (*), $50.

Copper Stocks.

New York.—Amalgamated Copper closed 81¼, a net loss of 1½.

Boston.—Butte Coalition closed 25½ a net gain of ¼; Calumet & Arizona closed 106, an advance of ¼; Calumet & Hecla closed 640, no change; Quincy Mining closed 90, no change; North Butte Mining closed 55½, no change.

Financial Notes.

The Pittsburg Malleable Iron Co. has declared the regular quarterly dividend of 2½ per cent. Directors of the Continental Zinc Co. have passed the dividend usually paid on July 1. Regular quarterly dividends were resumed by the Republic Iron & Steel Co., at the rate of 1¾ per cent on preferred stock, and an extra dividend of ¼ per cent was declared on account of the dividends on preferred accumulated since July 1, 1908, when the last dividend was paid. Dividend was payable July 1.

The Buffalo & Susquehanna Iron Co. has listed on the New York stock exchange 20-year 5 per cent debenture gold bonds to mature Jan. 1, 1926, with a mortgage provision for equal security on bonds issued under any subsequent mortgage, interest payable March and September. These bonds are subject to redemption at 105, and accrued interest, on any interest date after September, 1910. Authorized now standing, $1,500,000.

AMERICAN HONORED

In Retiring From General Managership of a British Corporation.

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng., July 1.

A remarkable compliment has been paid to an American in the retirement of Alfred Mosscrop from the position of general manager of Dorman, Long & Co., Middlesbrough. His retirement has been caused by ill-health, and a representative gathering of workmen and officials at the Britannia Works made him a farewell presentation which consisted of a set of solid silver candlesticks and four corner pieces bearing Mr. Mosscrop's monogram, and the initial of the firm, with two center pieces recording the presentation. Several speakers expressed regret at the retirement, particularly in view of its cause. Mr. Mosscrop, in responding, mentioned that he came specially over to England from America, on Mr. Dorman's invitation, to reorganize the works. He paid a tribute to the fair play he had received on the British side of the water, and mentioned that the directors had paid him the compliment of inviting him to retain his seat on the board, although he would be resident in America. This announcement was received with loud applause.

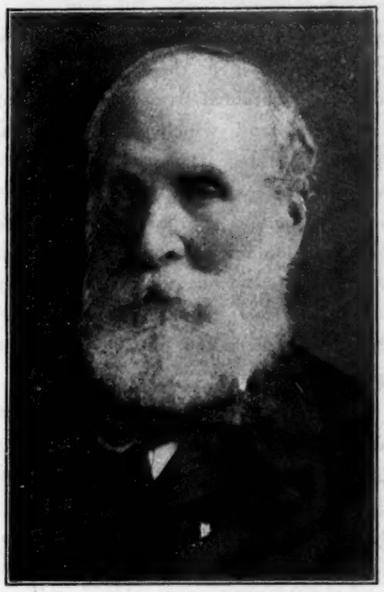
Another interesting presentation was one made to William Herbutt, who has for many years been an engineering inspector of railway material in Sheffield, and who is retiring on attaining his 76th year. For some years he served in connection with the engineering department of the Great Northern railway, going thence to Parkgate Iron Co., at the time when armor plates were first rolled in Great Britain. Then he went on to the Rutland Works of W. & S. Butcher, where the first welded steel tires were rolled. His next appointment was as inspector of railway material for the Queensland government, a position held for 23 years. Subsequent inspectorships were for the Cape government and the Chinese Imperial railways. A remarkably representative gathering on June 29 presented Mr. Herbutt a reclining chair, a spirit tentulus and a jeweled bracelet for Mrs. Herbutt. J. H. Barber, managing director of Brown Bayleys Steel Works, presided, and every large works of Sheffield appears to have been represented, including Bessemer & Co.; Cammell, Laird & Co.; Hatfield's Steel Foundry; Jessop & Sons; Vickers, Son & Maxim, and many others.

A very gloomy report has been issued with regard to ship building on the Clyde. The output during the first half of the year has amounted to 157,000 tons, an improvement of 17,000 tons over the production for the first six months of last year, although it is not much more than half what it was in 1907. Very few new contracts were placed during June, and some ship yards are practically destitute of orders.

DEATH OF A VENERABLE BRITISH IRONMASTER.

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng., July 1.

The death of Alderman Richard Williams, J. P., of Wednesbury, briefly noticed in a cablegram to THE IRON TRADE REVIEW of July 1, deprives



RICHARD WILLIAMS.

the British iron trade of its most venerable and picturesque figure. There must be a great number of ironworkers and ironmen generally in America, who personally knew Alderman Williams during his long connection with the Patent Shaft & Axletree Co., Wednesbury, since, during that term, thousands of men from the Black Country emigrated to America. His death took place at Brunswick House, June 28, when the veteran was approaching his ninety-fourth year. In spite of his advanced age, he maintained a wonderful health and vigor until about a year ago. A fortnight ago he took a chill, which developed pneumonia. His death has elicited tributes from all parts of the kingdom, as no man was better known in the British iron trade, while his enthusiasm for municipal improvements placed Wednesbury, the town of his adoption, under a lasting debt of obligation.

Coming from an old Welsh family, he was born in Liverpool, his father being a civil engineer, and he entered business with the firm of Fawcett, Preston & Co., assisting to fit up the ill-fated President, one of the first great Atlantic liners. So long since as 1844, he entered employment with Thomas Walker, then engaged in the development of the Brunswick Works, quickly becoming general manager. In 1866, the concern was turned into a limited liability company and acquired the Monway and Old Park works, of Lloyds, Foster & Co. Of this concern, Mr. Williams remained the head until 1891, completing a connection of 49 years, during which time the company earned a profit of two millions, and the number employed increased from a few hundreds to nearly 5,000. His connection with his managers and workmen was most cordial, and had much to do with the long period of peace, unbroken for a number of years, which prevailed in all departments of the establishment.

In spite of the great demands of the business he found energy for a very large amount of public work, which made the old town more tolerable for its residents than it had ever been. The town has been practicaly transformed. He became first mayor of the borough, and was also chairman of the first school board. Valuable services to the trade were rendered on the South Staffordshire mines drainage, as president of the mining accident committee, trustee of the mining accident fund, and as an earnest supporter of the Iron and Steel Institute, of which he was one of the original members, joining it in 1847. In 1901, he celebrated his diamond wedding, but a few months after lost his wife.

The Dunbar Furnace Co.'s No. 2 stack at Dunbar, Pa., has been in blast since November, 1906, and is now making about 250 to 300 tons daily. It made 44,746 tons for the first six months this year, and so far has not made a cast of "off iron" in over nine months. The fuel used exclusively is the "Dunbar" by-product coke made in Semet-Solvay retort ovens at Dunbar, Pa.

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THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

January	5,506
February	5,346
March	5,396
April	5,508
May	5,533
June	5,551

July 15, 1909.

INCREASED FINISHING MILLS AND SHEET AND TIN BAR PRODUCTION.

Some speculation has arisen in the iron and steel industry as to the source of supply of the increased steel requirements which the extensive additions to sheet and tin mill capacity either now projected or building in the United States will involve during the next several years. At the present time there are under construction three new tin plate plants with a total of 23 hot mills, these being the works of the DeForest Sheet & Tin Plate Co., at Niles, O., Phillips Sheet & Tin Plate Co., at Holliday's Cove, W. Va. and the Jones & Laughlin Steel Co. at Aliquippa, Pa. The Standard Tin Plate Co. Canonsburg, Pa., has recently installed four additional tin mills and the Carnahan Tin Plate & Sheet Co., Canton, O. one mill while the McKeesport Tin Plate Co., McKeesport, Pa., is planning 10 additional mills. The Jones & Laughlin Steel Co. which recently let contracts for 10 mills, has made arrangements to increase eventually its plant to 30 mills. It may be safely said that fully 50 additional tin mills will be available for production in this country within a very short time in addition to the 50-mill tin plate plant and 50-mill sheet plant just announced as a part of the United States Steel Corporation's plants for Gary. In sheet mills the past year has also witnessed considerable new construction, including that of the West Penn Steel Co., Brackenridge, Pa., three mills; Thomas Steel Co., Niles, O., five mills; National Sheet Steel Co., Massillon, O., three mills; Berger Mfg. Co., Canton, O., four mills. Furthermore, there have been several plants erected in which the rolling equipment was obtained from plants located elsewhere, and which had not been recently operated. The Inland Steel Co. will make extensive additions to its sheet plant at Indiana Harbor. Most of the interests building or increasing sheet and tin plate capacity do not supply their own steel, but will be obliged to draw their sheet and tin bars from the general market.

The principal producers of sheet and tin bars in the United States are Carnegie Steel Co., Republic Iron & Steel Co., Jones & Laughlin Steel Co., Lackawanna Steel Co., and Youngstown Sheet & Tube Co. The general rule applicable to the sales of these companies may be stated that the amount of semi-finished steel they are willing to dispose of as sheet and tin bars varies according to the demands for the raw steel by their finishing mills. Under equal conditions, these companies prefer to put their steel into finished products by reason of the greater profit to be realized.

The Carnegie Steel Co. is not a large general seller of sheet and tin bars under normal conditions, because it supplies the American Sheet & Tin Plate Co. with its steel and the consumption from this source, when market conditions are reasonably favorable, exceeds 100,000 tons monthly. The Republic Iron & Steel Co. is one of the largest sellers of Bessemer sheet and tin bars, but this company is planning a new tube works at Youngstown, O., and will probably continue to provide other finishing demands for its steel, so that its importance as an open market source of supply will likely diminish. The Jones & Laughlin Steel Co. is adopting a similar policy of increased finishing operations in connection with its new work at Aliquippa, Pa., and these, with its large tin plate plant now under construction, will divert considerable tonnage from the open market. The company has recently increased its steel-making capacity at its South side works, Pittsburg, by the construction of four additional Talbot continuous open-hearth furnaces and is planning a Talbot plant at Aliquippa, the output of which will be largely offset by the greater steel consumption in its own finishing mills. The importance of the Lackawanna Steel Co. varies inversely as to the state of the plate, structural shape and rail markets, since the company specializes upon the tonnage products. The Youngstown Sheet & Tube Co. within the past year has bought and enlarged a wire mill and is increasing its tube and sheet capacity so that it will have less surplus steel to offer to the merchant buyers. It is apparent, therefore, that unless greater capacity for what may be termed production of steel is built, the source of sheet and tin bar supply in the next several years is not likely to continue in the same proportion to the greater requirements of the new sheet and tin plate mills but rather will be restricted when the general demand for finished products approaches the normal point.

In this connection, it is interesting to attempt to find the immediate influence that has brought about the burst of activity in the tin plate market. Tin plate consumption in the United States is largely of a staple character, and if the past is a correct index to the future, it is not likely to show any marked gain in the next several years. The story of the past has been that the tin plate output of the country has not varied, up or down, by more than 10 per cent of the

total of the next preceding year. During the depressed condition of the trade in 1908, production was within 90 per cent of the preceding year. In 1906, the year of highest tonnage in the history of the tin plate industry, the bookings of the American Sheet & Tin Plate Co. were about 11,000,000 boxes, whch left about 2,000,000 boxes distributed among the different independents. The leading interest has since increased or improved its capacity so that it is in a position to meet the demands of a natural growth. The additional tin mills planned, being of the modern and improved type, will have a capacity of increasing the rated output of the country about 25 per cent, so that it is reasonable to believe that the serviceable equipment of the United States will soon be in the neighborhood of 16,000,000 boxes annually. This production does not take into account the extensive tin mill construction planned for Gary, which would increase this total by several million boxes.

It is expected that it will require several years before the natural growth will bring the demand on a parity with the possible estimated output.

STANDARD STEEL SPECIFICATIONS.

In so far as the standard specifications recommended by the American Society for Testing Materials, and printed in full in THE IRON TRADE REVIEW of July 8, apply to steel for ships and marine boilers, they will probably not affect ship construction appreciably, and marine boilers not at all.

The characteristics of steel entering into ship construction are fixed by the great classification and insurance societies, of which Lloyds is the oldest and chief, and Lloyds rules form the base of all others.

As to marine boilers, the United States statutes as set forth in the rules of the Steamboat Inspection Service, govern, to the exclusion of all other rules and specifications.

The engineering standards committee in Great Britain, the membership of which included representatives from the steel making, ship building, boiler building, bridge building, classification and insurance societies, etc., after nine years of almost constant labor, has recently brought in its report, the recommendations of which were practically agreed to in advance by all the interests affected, and Lloyds and Bureau Veritas and the British Corporation, the three great classification societies, to whose rules probably 95 per cent of the world's tonnage is constructed, have already incorporated the committee's recommendations in their rules.

We have prepared a brief comparative table showing the requirements as to tensile strengths of the United States as applied to boilers; Lloyds, which represents the committee's recommendations, and the American Society for Testing Materials. An inspection of this will show large variations as between the different specifications.

	United States.	Lloyds.	American Soc. for Testing Material.
Boiler plate	50,000-70,000	58,300-71,500	55,000-65,000
Boiler rivets	50,000-70,000	58,000-67,000	45,000-55,000
Ship plates	.....	58,000-71,500	55,000-65,000
Ship bars	.....	58,000-74,000	
Ship rivets	.....	56,000-67,000	48,000-58,000

Aside from the question of boiler material, which, as before stated, is governed exclusively by the statutes, it will be seen that the society's specifications are materially lower than Lloyds. This is especially noticeable in the matter of rivets. Hitherto it has always been considered good practice to avoid large differences in value between the material of rivets and other structural material. Such a marked reduction in resistance as is permissible under the society's specifications, must necessarily result in the use of greater rivet section, and in boiler work in particular this necessarily involves reduction of plate sections. The basis of calculations in standard marine boiler practice is 60,000 pounds for tensile strength, while the society's specifications for rivets allow of material as low as 45,000 pounds in value. Again, difficulty has been experienced in the past in securing heavy boiler material where the range in tensile strength was not greater than that allowed by the society's specifications, although this will probably not materially effect boiler making for stationary service, where shell plates are generally comparatively thin.

AMERICAN AND EUROPEAN SHOP PRACTICE.

We commend to the careful attention of IRON TRADE REVIEW readers the series of articles entitled "Comparison of Locomotive Building Methods in the United States, Germany and France," now appearing in our columns. Although these articles have special reference to locomotive building, establishments building other lines will find a number of points which they have in common. The comparisons of different processes and methods of execution are lucid and concise, and the figures should be valuable.

While in the main the contrast is favorable to American methods, yet there are features of European practice which are well worth copying; for instance, the German practice of using the oxyhydric or oxyacetyline burner for cutting shapes out of the solid rather than by forging under the hammer. While full credit is given American builders for rapid execution and time-saving methods, the value of the more accurate results obtained by European practice in some particulars is not lost sight of.

The case of the commonwealth of Kentucky against the United States Cast Iron Pipe & Foundry Co., brought at Newport, has been dismissed. The suit was filed on behalf of the state under the section of the Kentucky statutes which provides that land held by a corporation for manufacturing purposes and not so used shall be forfeited to the state. The property in controversy was formerly known as the Addystone Pipe Foundry. The court in dismissing the case, held that the property is necessary in the business of the corporation.

WELL DISTRIBUTED

Was Gain in Exports—Imports Are Very Small.

A comparison of exports in May with exports in January shows that the gain of 39,888 tons, or 57 per cent, was well distributed. There was a slight decline in structural material, while in wire nails there was a large proportionate decrease, from 2,610 tons in January to 1,581 tons in May. Practically every other item shows an increase. The most marked increases were in rails, 13,137 tons to 30,794 tons, or over 17,000 tons, in wire, plain and barb, from 9,123 tons to 13,364 tons, or over 4,000 tons, in sheets and plates, from 8,532 tons to 13,881 tons, or over 5,000 tons, and in pipes and fittings, from 9,167 tons to 11,788 tons, or nearly 3,000 tons.

The May exports were just equal to the highest rate ever maintained for a full year, but as they exceeded the exports in the preceding months by a large margin, the total exports in the 11 months ending May fell 13.5 short of the exports in the 11 months ending May, 1908, the earlier period covering five months of heavy exports preceding the general decline in international trade. The decrease is not uniformly distributed. While there was an average decrease, some lines show a small increase and some a large increase. Comparing the 11-month periods, scrap shows a gain of over 10 per cent, billets and sheet bars 13 per cent, wire rods 85 per cent, sheets and plates 27 per cent, and cut nails and spikes 18 per cent. Structural material decreased 24 per cent, and rails 20 per cent.

Thus the export trade has really been very steady. It was first built up to important proportions in the calendar year 1904, in which year the total first passed the million ton mark, and once built up it has been maintained pretty steadily. In view of the survival in some quarters that our exports constitute a dumping process it should be particularly noted that as demand decreased our exports decrease, and as demand increases our exports increase. Domestic and foreign demand fluctuate more or less together. If dumping were practiced our exports would have increased when domestic demand fell off so sharply in the fiscal year ended June 30, 1908, but statistics show that there was a slight decrease in exports in that year.

Value of All Exports.

The value of all iron and steel exports, including the tonnage lines referred to above, as well as hardware, cutlery, machinery, etc., but excluding agricultural machinery, amounted to $12,993,197 in May, and to $131,200,451 in the 11 months ending May. The value of May exports exceeded the average of the 11 months by 9 per cent, while the weight of tonnage lines in May exceeded the 11-month average by 28 per cent, so that it may be assumed the non-tonnage lines in May showed no increase, but rather a decrease.

Assuming the value of all iron and steel exports in June to have been the same as in May, the fiscal year's total would be about $144,200,000, comparing with previous fiscal years as shown below:

Year ended June 30.	Value.
1900	$121,913,548
1901	117,319,320
1902	98,552,562
1903	96,642,467
1904	111,948,586
1905	134,727,921
1906	160,984,985
1907	181,530,871
1908	183,982,182
1909	144,200,000*

*Estimated.

Imports Negligible.

Our imports continue at a low rate, the May total of tonnage lines being 18,352 tons, against 17,772 tons in April and an average of 17,432 tons in the 10 months ending April. The May imports included 8,747 tons of "pig iron," which is chiefly ferro-manganese and spiegeleisen, with some other ferro alloys, and 6,488 tons of tin plates, which are imported almost exclusively for re-export in the forms of containers, etc., with the benefit of a drawback of 99 per cent of the duty originally paid. Outside of these items, our imports totaled 3,117 tons, the largest single item being 1,008 tons of billets and bars and steel not elsewhere specified.

IRON AND STEEL EXPORTS, GROSS TONS.

	May,		Eleven months ending May.	
	1908.	1909.	1908.	1909.
Scrap	1,840	3,819	18,527	21,193
Pig Iron	3,621	5,121	47,612	42,332
Billets, sheet bars, etc.	3,831	13,981	87,310	98,757
Wire rods	401	1,427	6,072	11,196
Rails	11,440	30,794	263,108	213,315
Structural iron and steel	5,091	5,809	125,882	92,820
Bar iron	634	1,297	12,443	10,536
Steel bars	2,818	4,763	60,106	45,461
Sheets and plates	8,528	13,881	95,527	121,787
Tin plates	2,220	641	14,897	4,465
Hoop, band and scroll	170	270	8,285	3,213
Wire	12,077	13,364	146,545	123,826
Wire nails and spikes	1,664	1,581	34,307	24,350
Cut nails and spikes	588	848	5,953	7,034
All other, including tacks	238	593	5,283	6,088
Pipes and fittings	8,880	11,788	159,635	118,312
Totals	64,041	109,977	1,091,492	944,685

IRON AND STEEL IMPORTS, GROSS TONS.

	May,		Eleven months ending May.	
	1908.	1909.	1908.	1909.
Scrap		642	17,077	5,131
Pig iron	4,975	8,747	194,751	94,032
Billets, bars and steel n. e. s.	818	1,008	15,401	11,524
Wire rods	630	692	12,461	10,320
Rails	7	6	2,633	1,292
Structural	51	63	1,470	5,384
Bar iron	300	501	31,645	14,051
Sheets and plates	152	160	2,381	2,978
Tin plates	6,642	6,488	55,180	46,725
Hoop, band and scroll	9	45	472	1,034
Totals	13,584	18,352	333,471	192,671

ACCIDENT PREVENTION

As Illustrated by the Experience of Cleveland on the Fourth of July.

Last year, 10 people lost their lives and 62 were seriously injured in the city of Cleveland by explosions of fireworks or by fires connected with the celebration of the Fourth of July. During the past year, the city council passed an ordinance prohibiting the sale of fireworks of any kind and also the making of displays, except under city supervision. The results were that the ordinance was strictly enforced, no one was injured and a sane and safe Fourth was thoroughly enjoyed.

It was feared, however, that if the young people of the city were deprived of their fun in the fireworks line and no substitute provided, the fireworks ordinance might be repealed, hence Thomas D. West, of the West Steel & Iron Castings Co., and president of the American Anti-Accident Association, conceived the idea of having a carnival for the children in place of their usual Fourth of July celebration. The carnival, although hastily organized, was a great success, and public sentiment in Cleveland now seems to be overwhelmingly in favor of not repealing the ordinance. A permanent organization for the proper and patriotic celebration of the Fourth is to be formed.

Mr. West believes that the success of Cleveland and a few other cities in abolishing the promiscuous use of fireworks on the Fourth of July forms an important object lesson in showing how accidents can be prevented. He says that just as accidents are being prevented on the Fourth, they can also be prevented, to a very large extent, throughout the year, in all the manufacturing concerns of the country, if employers and employes will co-operate.

B. H. Fry, Amenia, New York, who recently purchased the Chatham, N. Y., furnace, advises that the property is being put in shape for operating in case a suitable supply of hematite ore is found available. Two or three interests are negotiating for the purchase or lease of the property.

THE PERMANENT MOLD AND ITS EFFECT ON CAST IRON[1]

By E. A. Custer.

In looking over the work done by this and kindred scientific societies, one cannot fail to be impressed with the wonderful advancement that has been made in the knowledge their close scientific research has given us, as well as with the logical means they have pointed out in order that this knowledge may bear practical fruit. Day by day the patient, painstaking work is carried on and unselfishly given to the world at large. It is perhaps natural that the major part of these researches are directed toward steel. The ramifications of this metal are extending, and it is small wonder, in view of what has been accomplished, that the attention of scientific thinkers and investigators has been largely turned to its study. It is at this stage the writer comes forward with a plea for the humble cast iron.

The work noted in this paper covers a limited field, but enough has been learned to give rise to the thought that in this crude material there lurk potentialities which, when scientifically investigated, may not only enlarge this field but put an entirely different phase on our understanding of cast iron.

Some four years ago, under the stimulus of a disastrous strike, we started on the hunt for the permanent mold, and finally selected cast iron as the material offering the greater number of advantages and the least number of objections. In the course of our investigations it was noticed that certain of the castings when cool were soft while others were hard—in fact, chilled white—the hard castings being in an overwhelming majority. As a remedy we tried various mold coatings of inert materials, but we found that while certain of these coatings gave very good results when applied thickly, yet they slowed up the process. In an effort to gain time the coating was neglected, and it was ascertained that when working at good speed, the major portion of the castings were soft and could be easily machined. When the coating was entirely discarded and the castings poured and removed from the mold as soon as they had solidified sufficiently to handle, the total production was soft and no hard castings were produced. After some

[1]Read before the American Society for Testing Materials.

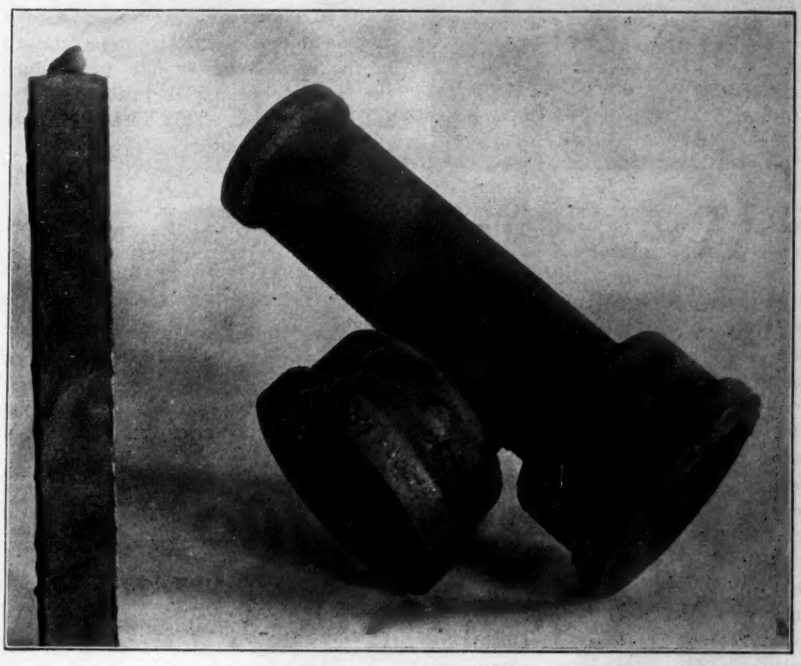


Fig. 1—Casting Showing Globules of Iron Exuding Through the Pores, and Cast Iron Bar With Excrescence at the Top.

14,000 or 15,000 castings had been made under every condition that could be obtained in an ordinary foundry, the following bases were established:

(1). Molten cast iron does not chill (using the word "chill" to express hard, white crystals) until after it has solidified.

(2). Chilling molten iron swiftly to the point of solidification, and then allowing it to cool normally, produces a homogeneous metal.

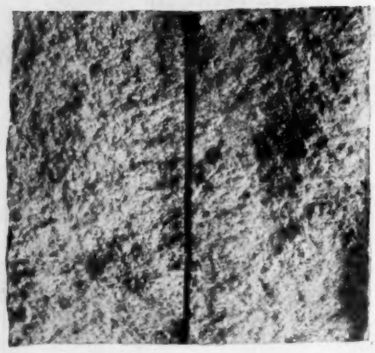
(3). This homogeneous metal possesses certain characteristics that are entirely absent when the same molten iron is poured in sand and allowed to cool in the mold.

Fig. 2—Fracture of Partially Chilled Cast Iron.

(4). The chemical constituents of the iron, with the exception of carbon, have little or no effect in modifying these characteristics, when gray iron, within ordinary limits, is used.

Inasmuch as all work we have done has been in sections ranging from 2 inches to ⅛ of an inch, it is obvious that the results obtained must be considered in direct comparison with those obtained when these same sections are cast in sand. The casting so low in silicon that it will form white crystals when made in sand, will inevitably form the same white crystals if cast in a permanent mold, even though treated by the process outlined above. This applies principally to thin sections; how far this process can affect thick sections depends entirely upon the ability of the investigator to rob the molten mass of its heat.

In support of the first two propositions it may be said that molten cast iron is a solution of carbon in iron, with the addition of silicon, phosphorus, sulphur, manganese and certain impurities—all forming a homogeneous,



FIGS. 3 AND 4—FRACTURE OF CAST IRON (A) SOFT. (B) HARD.

fluid mass. Now, if this mass can be instantly cooled it will still be homogeneous, the different elements not having time to segregate. Instant cooling is clearly impossible, but we find that swiftly chilling the molten mass produces practically the result desired. The molecular action of forming white, hard crystals is only started. When the casting is removed at a bright, yellow heat, with the interior still molten, this molecular action—which is nothing more nor less than a continued closing together of the particles—compresses the molten iron to such an extent that globules of iron exude through the pores and form small excrescences on the surface. This is further shown by the fact that when iron is cast in long bars these bars do not pipe but the molten iron moves towards the top of the bar, which is practically molten, and forms excrescences at the top. This is shown in Fig. 1.

Since the cooling medium, in other words, the iron mold, is removed at the point of solidification, there is no further tendency toward forming larger crystals; furthermore, segregation is completely prevented by reason of the rapidity with which this chilling action is performed. We have tried to reproduce this effect in sand molds, but with no success.

Fig. 2 shows a broken section of a casting one side of which was retained in the mold long enough to produce the white crystals; the other side is soft gray iron. This clearly proves the first proposition.

FIG. 5—DISTORTION OF THIN CASTING ONLY 0.002 INCH, AFTER BEING HEATED TO A BRIGHT RED AND QUENCHED IN COLD WATER. THIS OPERATION WAS REPEATED TEN TIMES.

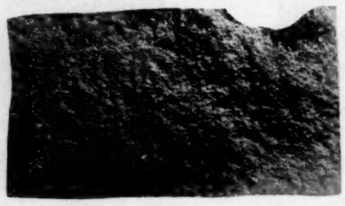


FIG. 6—FRACTURE OF HIGH-SILICON LOW-SULPHUR CAST IRON—HARD.

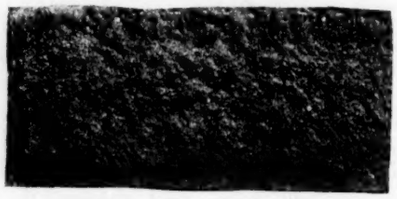


FIG. 7—FRACTURE OF LOW-SILICON HIGH-PHOSPHORUS CAST IRON —HARD.

Fig. 3 is a section from another casting, which was taken from the mold when the point of solidification was reached and was allowed to cool normally.

Fig. 4 shows a section of the same casting taken from the mold at a bright red and quenched in water.

Nos. 2, 3 and 4 were poured from the same ladle of iron. The analysis of this iron is: Silicon, 2.12; sulphur, 0.098; phosphorus, 0.70; manganese, 0.38; total carbon, 3.49.

No. 2 is useless as a casting, showing white crystals on one side and dark gray on the other.

No. 3 is clean, soft, easily machined and is as nearly homogeneous as can be shown by any test we can devise. It has a dark gray fracture, machines cleanly, the chips being free from fine dust, and does not show the usual hard scale on the exterior. When heated to a bright red or yellow heat and quenched in cold water it has a very light gray fracture and is as hard as tempered tool steel. When used as a cutting tool it will outlast any ordinary high-carbon steel. Bring it in contact with a working dynamo after hardening, it becomes a permanent magnet. It does not possess the disadvantage of increasing in bulk when repeatedly heated and cooled. This is illustrated by Fig. 5, a casting that has a distortion of but 0.002 of an inch after being brought to a bright red heat and quenched in cold water, the operation being repeated 10 times. Once having imparted to the iron the properties enumerated above, it is impossible to remove them except by remelting. If Fig. 3 be held in a bright flame until metal drips from the end, the remaining iron will be unchanged in every particular, with the exception of a slight coating of oxide.

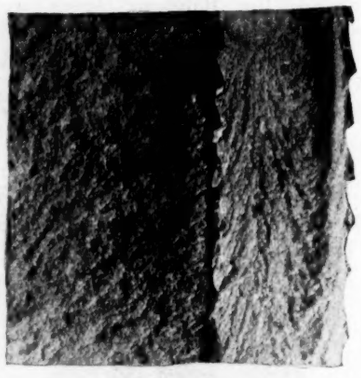


FIG. 8—FRACTURE OF FILE AND OF HARDENED CAST IRON.

FIG. 9—FRACTURE OF ORDINARY CAST IRON.

Fig. 4 shows a light gray fracture, and is an exact duplicate of No. 3, hardened. When heated to the temperature at which it was hardened and allowed to cool normally, it reverts to the characteristics of Fig. 3. This heat need not be long continued;

the mere heating to the proper temperature is sufficient to acomplish the result.

Figs. 6 and 7 are from the same mold. Their analyses follow:

No. 6.		No. 7.	
Silicon	2.94	Silicon	1.75
Sulphur	0.032	Sulphur	0.07
Phosphorus	0.028	Phosphorus	1.42
Manganese	0.38	Manganese	0.41
Total carbon	3.08	Total carbon	3.22

These present precisely the same phenomena as Figs. 3 and 4, so far as any tests applied will show.

It would seem, from the analyses of the treated samples, that the peculiar properties observed are entirely independent of whether the silicon, sulphur or phosphorus is high or low, at least within the limits noted. It is immaterial whether the silicon is 1.75 or 3 per cent, the sulphur, 0.02 or 0.12 per cent, or the phosphorus 1.50 or 0.03 per cent; in any event the same practical result is obtained if the procedure outlined is correctly carried out. In no respect have we been able to duplicate these results when the same iron was poured into sand molds of like dimensions.

The logical explanation of this hardening property is that the molecular action, which produces a homogeneous metal by chilling molten iron to the point of solidification, is again the medium of producing the extreme hardness. The first chilling brings the molecules to what might be termed a receptive position. Removing the chilling medium holds this position, and as the temperature falls the molecular position becomes permanent. If at the receptive point the casting be quenched in cold water, the great unmeasurable force of heat expansion and contraction is brought into play. No one knows how many tons per square inch is exerted when molten iron cools. This force is always greater than the tensile strength of the material under treatment. If, now, the semi-solid iron be subjected to this presumably enormous force exerted through the mold swiftly robbing it of its heat, it probably follows that the molecules are crushed together with an enormous pressure, and an extremely dense structure results. If the casting be quenched in oil, there is no hardening effect; it remains soft. If thrown into boiling water, it cracks into pieces.

Fig. 8 is the fracture of an ordinary forged and hardened steel file placed alongside of hardened cast iron, shown in Fig. 4. The analyses follow:

File.		Cast iron.	
Silicon	0.19	Silicon	2.12
Sulphur	0.022	Sulphur	0.098
Phosphorus	0.019	Phosphorus	0.70
Manganese	0.25	Manganese	0.38
Total carbon	1.28	Total carbon	3.49

This photograph shows very clearly the coarse grain of the cast iron and the metal flow of the steel file, yet the cast iron is the harder metal.

Fig. 9 gives a very good idea of the difference between casting in sand and in a permanent mold. This fracture is of the same iron that was used for 2, 3 and 4, and was cast in a green sand mold and allowed to cool normally. Figs. 10, 13 and 20 are microphotographs of Figs. 3, 4 and 9, and present a very fair field for discussion. They were etched with picric acid, and each given a magnification of 104 diameters.

Fig. 10—Magnified 104 Diameters.

Fig. 11—Magnified 30 Diameters.

Fig. 12—Magnified 30 Diameters (Oblique Light).

Iron Cast in Permanent Mold. (Soft. Same as Fig. 3.)

Fig. 13—Magnified 104 Diameters.

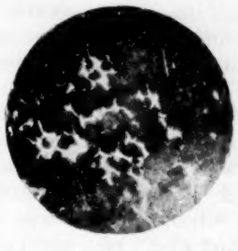


Fig. 14—Magnified 104 Diameters.

Fig. 15—Magnified 104 Diameters.

Fig. 16—Magnified 30 Diameters (Oblique Light).

Iron Cast in Permanent Mold. (Hard. Same as Fig. 4.)

Fig. 17—Magnified 104 Diameters. Iron Cast in Permanent Mold (Hard, Same as Fig. 6).

Fig. 18—Magnified 104 Diameters.

Fig. 19—Magnified 104 Diameters.

Fig. 20—Magnified 104 Diameters.

Iron Cast in Permanent Mold. (Hard. Same as Fig. 7.)

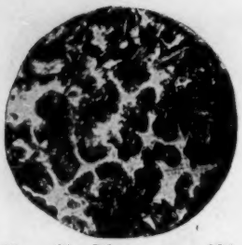


FIG. 21—MAGNIFIED 104 DIAMETERS. SAME IRON AS NO. 3, BUT CAST IN SAND (SEE FIG. 9).

FIG. 22—MAGNIFIED 104 DIAMETERS. FRAGMENT FROM LARGE CASTING.

The fracture photographs are given a magnification of 2½ diameters.

In this work carbon plays a large part, although it does not seem to have the same effect as when iron is cast in sand. A few notes on this phase may be interesting.

Since all the carbon in molten iron is in solution, and exists in the combined form, then, if molten iron be instantly cooled to 1,000 degrees Fahr., all the carbon will be held in the combined form, there will be no free carbon. If, however, it be instantly cooled to the point at which the iron sets, and then allowed to cool normally, the carbon will be in the combined form at the time of setting, but will change to the free form as the cooling progresses. This formation of free carbon is very rapid; the major portion present in the casting is formed within a few seconds after it is taken from the mold. The analyses below give a very fair idea of this action, the pieces in question being 6 x 1¼ x ½ inches:

	Combined carbon, per cent.	Free carbon, per cent.	Silica, per cent.
Cast in sand and cooled normally	0.21	2.93	2.61
Taken from permanent mold at bright yellow and quenched	1.50	1.52	2.61
Taken from permanent mold at bright red and quenched	0.49	2.61	2.61

It will be seen from this that two-thirds of the combined carbon has been changed in the few seconds required to cool from a bright yellow to the bright red. The free carbon in all these castings is not in the form of graphitic carbon, as we usually see it in ordinary cast iron, but partakes more of the character of annealing carbon, as exhibited in a malleable casting.

Here we have an iron containing 2.61 per cent silicon and 2.50 per cent free carbon that possesses the property of taking a temper equal to tool steel, and this without the least indication of what is generally termed "chill."

At this writing the tensile strength is under investigation. The scope of this research is very large, and many elements must be taken into consideration. Our results so far indicate that cast iron, when chilled in a permanent mold to the point of setting and then cooled normally, is greatly increased in tensile strength, and that this strength does not materially vary within the chemical range of ordinary foundry iron.

The thickness of the section and the initial heat of the casting have the most influence in determining the ultimate strength, and these variations call for an extended consideration.*

Heretofore cast iron has had a rather poor reputation, being generally unstable and yielding reluctantly to any treatment that would tend to improve the quality. The permanent mold has done valuable service in demonstrating that the simplest of simple heat treatments endows it with characteristics that entitle it to a very large portion of the consideration that has hitherto been enjoyed by wrought iron and steel. One hardly dare say that the ultimate possibilities of this metal have been reached, nor can it be considered in the light of an unstable and refractory medium. On the contrary, it answers readily and surely to the proper treatment. The field is wide, and gives promise of much that would place cast iron on a far higher plane than it occupies today.

I wish to acknowledge the keen interest and self-sacrificing help of Robert A. Pitman, without whose devoted work much of what has been accomplished would have been lost.

ENGINEERING RESPONSIBILITY.[1]

(Continued from last issue.)

Treatment of Materials.

There is, however, another phase of this part of our subject. Unfair treatment is very much broader than the obvious misuse of a bridge or of a moving vehicle. The materials entering into a structure may be unfairly treated. If the calculated strains are too high, or, what amounts to the same thing, too low a factor of safety is employed, materials are unfairly used. Still further, where a structure is a composite it may, and undoubtedly does, often happen that the elements making up the composite are unfairly treated, as when, for economic reasons, not enough money is spent to properly install the structure. For example, a steel rail called upon to do its work supported by too few ties, insufficient ballast and a badly drained sub-grade, is unfairly treated. Moreover, the state of repair in which structures are maintained is clearly an element in their fair treatment. If not enough money is spent in repairs and parts become weakened by decay, corrosion or wear to such an extent that failure results, it is entirely obvious that the failure must be attributed to unfair treatment.

We have gone thus quite at length into detail in what has preceded in order that we might have definitely before us the elements entering into this problem and be able to see more clearly where truth and justice lie between the conflicting interests. If now our analysis of the causes of failure is accepted as correct, it is evident that freedom from failure in construction depends on the conscientious and intelligent action of four different contributors to the final result. The materials employed must be conscientiously and intelligently made, and must be what they are supposed to be. The workmen who use these materials must do their work conscientiously and under intelligent guidance. The engineer who designs the structure must have abundant knowledge of the properties of the materials he is using and must take as little as possible for granted in deciding on shapes, sizes and kinds of materials to be employed. And, finally, the one who installs and operates the structure, when it is completed, must keep it in proper repair and look well to it that no duty is required of it which subjects it to unfair strains.

Shifting Responsibility.

It is likewise evident that, since the four parties involved in successful construction have different individualities and may have diverse and even antagonistic interests, there is abundant reason why there should be an attempt to shift responsibility for failure. And, indeed, we might perhaps safely go a step further and say that there is abundant reason why each of the four parties should try to limit the part which his own work plays in the final result, and say plainly, if the other three had done

[1]Presidential address delivered before the American Society for Testing Materials on June 29 by Dr. Chas. B. Dudley.

as they should there would have been no failure. The man who furnishes the material is tempted to say, "If the designer had allowed a proper factor of safety everywhere, if the workmen had done their duty, and if the structure had received only proper fair treatment, almost any material would have been good enough." The engineer who makes the design is tempted to say, "if the material had been what I had a right to expect it to be, if the workmen had done good work and there had been no abuse of the structure in service, there would have been no failure." And so on, for the others. It is plain that the problem of obtaining successful constructions is a complicated one, and that the chances for divided responsibility which are involved are no small element in this problem.

An Opportunity.

Within the last few months two episodes have ocurred which so clearly illustrate two phases of our theme that we cannot forbear to quote them. The two phases are unfair treatment and the inference that the blame for failure rests on some one else. It will be remembered that within the past two or three years there has been much outcry in regard to broken steel rails, and the steel rail manufacturers have, in the technical press, been quite severely called to account for their shortcomings. Indeed, from this platform, in the last annual address, some statements were made indicating that it was believed that the maximum fiber stress in the 100-pound rail under present conditions of wheel loads and speed was not over 12,500 pounds per square inch. Some two months ago we received a letter from one of the ablest metallurgical engineers connected with steel rail manufacture in this country, in which this statement was very seriously called in question. The writer of the letter figured that under many conditions the fiber stress might be double the figure given, and that under extreme, but still possible, conditions the fiber stress might reach nearly four times this figure. The obvious conclusion was, although this was not stated in the letter, that it was these extreme fiber stresses, this unfair treatment, which caused the rails to break. We have tried in vain thus far to get some one much more competent than ourselves to prepare a paper on this subject for this meeting and one object we have in mind in citing it now is to stimulate study and attention to it. Will not some one take hold of this problem and give it an exhaustive treatment, allowing the maximum effect to wheel loads, counter-balance, effect of the steam, want of rotundity, flat spots, nosing and speed? A theoretical treatment, even though we are not all satisfied that the rail acts like a continuous girder supported at the centers of the ties, cannot fail to be valuable.

Rail Failures.

The other episode is the experience of the Atchison, Topeka & Santa Fe railroad with broken rails on different sub-grades. This road had some 227 miles of roadbed which were sandy, porous and well drained, and 91 miles which were largely clay of a kind that holds water. The traffic was the same over both portions and the rail all 85-pound rail. The rail breakages in one year were two and a half times greater per mile of track on the clay sub-grade than they were on the sandy sub-grade. Mr. Wells, the general manager of the road, was kind enough to say, in communicating this information, that these facts seemed to confirm the statement made in the last year's annual address that "there are indications that rail failures are a question of geography." More to the point for our present discussion is the obvious conclusion that the use of rails on clay sub-grade full of water without sufficient porous ballast is unfair treatment, and that breakages, under such conditions, can not justly be said to be the fault of the rail.

Signs of Better Days.

But perhaps we have said enough in analysis of the causes of failure. Let us now devote a few moments to precautions that may be taken with material and workmanship in the interests of safety; and to a consideration of what should be our mental attitude toward design and unfair treatment. And first as to workmanship. Under present conditions the necessity for close supervision is evident. Managing men everywhere recognize this necessity and are employing all means at hand to secure it. We knew an officer of a large corporation some years ago who said to his board of directors: "If you will allow me to spend $50,000 a month more in salaries, so that I may give your work better supervision, I will give it back to you four-fold." Moreover, with the growth of modern industry and especially with the development of machinery as an element in this growth, the individuality of the workingmen has necessarily diminished and the present industrial ferment of strikes and lockouts, with their accompanying riots and violence, is, as we interpret it, the revolt against this debasement of individuality. That the revolt should at times go too far, that unreasonable demands should be made, that demagogues and agitators for their own advancement should get into positions of prominence, is perhaps to be expected. As time progresses these will pass. It takes time to bring a change of views in both employed and employers. Already there are signs of something better and our belief is that in the not far distant future, as the result of wiser management on the part of labor organizations and reasonable concessions on the part of employers, there will be a return by the workingmen to the old-fashioned virtues of interest and pride in their work, and unswerving loyalty to the organizations which they serve. The effect of this change on the quality of workmanship needs no comment.

A Most Important Mission.

Second, with regard to material. It is difficult for us to see how any one who is responsible for safey in structures dare at the present time put material into these structures which has not been bought on carefully prepared specifications, and which, before acceptance, has not been rigidly inspected and tested. In time past, before consumers understood the demands which the service makes on materials, the reputation of the maker was perhaps the best safeguard known for good materials and was accepted as reasonable defense in the investigation following disaster. But in these days, when the service has been so frequently questioned, when so much accumulated information is available, when experts and facilities for testing are so largely multiplied, we cannot help feeling that the management that puts materials into service, especially where safety is involved, without careful and conscientious inspection and testing, is taking a risk that it is no longer entitled to assume. It is gratifying to be able to see that, as the years go by, there is constant and steady growth in this field. And while the ground is still far from being covered and the number of standard specifications still far too small, each year brings some progress, some steps forward. This society has a most important mission to fulfill, and the

publications of no organization that we know of anywhere are doing more to elevate the standard of quality of materials of construction than the annual volume giving the results of the deliberations of this body.

Necessity of Investigation.

Third, bad workmanship and bad materials can apparently be so controlled as to secure safety by sufficient supervision and by having proper specifications, with rigid inspection and test. But how about the unfair treatment of materials, or the structure made from them? Here no supervision beyond some meager legislative enactments and the condemnation of public opinion in case of disaster are possible. It is, of course, true that those in charge of the construction and operation of utilities in which the public safety is involved are constantly face to face with the possibilities of heavy losses in the way of damages for accidents, and no doubt this is a most powerful check against unfair treatment. But it has seemed to us for a long time that the producers of material have far too much neglected their opportunities. Surely it is as legitimate that the producer should study the treatment his material gets in service as that the consumer should study the methods by which that material is made. It may take the consumer a few years to become familiar with the idea of being told that he has not treated material fairly, since he is undoubtedly accustomed now to thinking that he can do what he wishes with what he has bought and paid for; but we are confident there would have been fewer complaints of material in the past if the method we have suggested had been in vogue. It is, of course, not to be understood that we are recommending howls about unfair treatment as excuses for inferior materials. What we have in mind is that careful studies and investigations should be made by the producer, leading up to demonstrations if possible. It is common experience that the truth is reached with much greater certainty and speed if a problem is attacked by two parties who approach it from different standpoints and are actuated by antagonistic interests. Our whole Anglo-Saxon jurisprudence is founded on this method of procedure.

Fourth, what shall we say of the engineer who makes the design? We have already described his difficulties, pointed out his limitations and expressed our sympathy with him in his chance failures. It remains to put on record a few thoughts which have forced themselves on us. Not once but many times, while preparing this paper, as especially when contemplating the difficulties of the engineer who makes the design. The truth is we are using materials in construction without sufficient knowledge. There is crying need for experiment.

The factor of safety everywhere is largely a guess. The late A. L. Holly, one of the brightest mechanical engineers in this country 25 years ago, used to speak of "the ridiculous factor of safety, one-half of which is a factor of ignorance." We cannot help feeling that no better use could be made of some small fraction of the millions that have been accumulated by individuals in connection with our great industries during the past half century than in the establishment of a bureau of engineering research. Who will avail himself of this magnificent opportunity?

Just a word in conclusion. No one, I am sure, can contemplate the situation which we have been trying to discuss without being impressed with the diverse and ofttimes antagonistic interests involved. The producer of material is anxious to secure the largest amount of successful output and the greatest possible amount of reward therefor. The consumer wants to limit this by restrictions as to quality and to obtain the material at the lowest possible. figure. The workman's interest is to secure the maximum of pay for the minimum of effort, and in this struggle it may perchance happen that the quality of work suffers. The employers' interests are clearly the reverse of the workman's, and so on. The foundations of these diverse interests are of course very deep, and with the present organization of society it is not easy to see how they are to be obliterated or their antagonism neutralized. But we beg to make one suggestion. Would not an infusion of genuine conscientiousness into our industrial life bring an amelioration? If a little less energy was expended in the mad race for wealth and a little more zeal manifested in maintaining the rugged virtues of honesty, integrity and fair dealing, would not some of the friction and contention of our present commercial life disappear? We must all live together, and surely harmony is better than contention. There are some things in life of more value than money.

COMPARISON OF LOCOMOTIVE BUILDING METHODS IN THE UNITED STATES, GERMANY AND FRANCE.*

By Marcel Bloch.[1]

In all three countries as soon as the draftsmen have finished their work, the chief draftsman receives from them a complete statement of raw material required, which is transmitted to the purchasing department.

The rapidity in getting out drawings, as well as the small amount of checking and inspecting to which American work is submitted, permits them to get these material sheets out much sooner than their European colleagues. The purchasing department immediately gets in touch with makers of material, in Europe as in America. But the centralization of similar industries in the large New York and Chicago office buildings singularly facilitates and expedites the transaction between builders and supply houses. A single building in New York, for instance, such as the Hudson Terminal building, contains the offices of the American Locomotive Co., the Carnegie Steel Co., the Worth Bros. Co. (steel plates), the Railway Steel Spring Co., etc. In a few minutes orders can be placed for plates, axles, tires, wheels, etc., after short interviews with the manufacturers, and without exchanging letters or telegrams. The rapidity with which these orders are placed is further enhanced by the extraordinary capacity of American shops, which can obtain from the manufacturers contracts for a certain period of time, enabling them when placing the order simply to state the amount and delivery required. The Pratt & Letchworth Co. and the Union Steel Casting Co. may be quoted as examples; these companies furnish the American Locomotive Co.'s steel castings almost exclusively. In Germany some of the locomotive builders, such as Henschel and Borsig, are manufacturers of their own raw material. Others obtain theirs from the manufacturers in Ruhr and Schleswig and must bargain with the latter for prices and deliveries.

In France, with the exception of the Creusot Co., no builders produce their own materials, and it appears that every order placed must be specially negotiated with the manufacturers.

These different conditions naturally have a great influence on the dates of deliveries. As a general impression, I

*Translated from the *Revue Generale des Chemins de Fer*, by the *Railroad Age Gazette*.

[1]Motive power inspector of the Paris-Orleans railway.

should say that in the United States the capacities of plants are designed not for supplying the average demand of the country for such products, but for maximum requirements, when the country is in full prosperity. It is therefore clear that orders placed during a time of medium prosperity can be executed very rapidly by companies thus equipped. Of course, the execution of the recent order placed by the Paris-Orleans railway with the American Locomotive Co. for 30 Pacific type locomotives cannot be taken as a conclusive demonstration of the early deliveries possible in America, for it was placed during a period of general depression, when orders were lacking everywhere. It is, however, interesting to note that the Worth Bros. Co., started rolling the steel boiler and tank plates for this order on the same day that the telegram giving them the order was received, and that the entire order was executed in three weeks' time. Mr. Garbe, general manager of the Prussian State railways, says in his recent work, "Die Lokomotive der Gegenwart," that when rush orders are placed American locomotive builders can be in receipt of the boiler steel within five days, and that four days later cast steel side frames can be ready for slotting.

In Germany these deliveries are much less rapid. The large orders placed by the navy often crowd manufacturers to their full capacity. For such builders as Henschel and Borsig this difficulty is avoided, as they can place their orders ahead of others, being the owners of their own material supply shops. The following example may be quoted: A number of plates having been ordered from the Borsigwerk (Schleswig) the latter was able to submit for inspection 30 boiler plates which had been rolled during the night. This happened during a period of great activity and was only rendered possible by the issuing of special orders to the works to get these plates out ahead of any other orders they might have on their books. As a general rule, however, German manufacturers are able to deliver their material in good time and night work is always done during prosperous times.

In France the mills are less well equipped than in Germany. In normal times they are able to offer satisfactory deliveries, but as soon as orders increase become congested with work and the shipments are delayed, often for several months. For boiler and frame plates the shipments vary from three weeks to four months, according to the amount of work in hand.

Shop Practice.

It is not the writer's object to go into intricate details of shop construction; this varies very greatly and is entirely dependent upon local conditions. For instance, the American Locomotive company has been able to extend its works at Schenectady, having ample property at its disposal, while the Baldwin Locomotive Works, being hedged in at Philadelphia, has been obliged to seek additional shop space by superposition of several stories. However, on account of their larger capacities, American and German builders have been able to expand their shops much more than it was possible in France.

Power Houses.

Power houses are very similar in all three countries, with the exception that automatic stokers are used almost exclusively in America and Germany while in France their number is limited; it is also noticeable that in the latter country the power house is not developed on the same scale as the shops themselves. Most French shops appear to be always short of compressed air for air hammers, etc.; their compressors rarely yield more than 350 to 500 cubic feet per minute, while in America a production of 1,400 to 1,700 cubic feet is common.

Pattern Shop.

The differences in all three countries are trifling; the shops can deliver a pattern for a single cylinder in about three weeks, and for a double cylinder in about one month.

Foundry.

In addition to their size and the large number of cupolas as compared with the actual production, American foundries are exceptionally well equipped with molding machines, crane facilities and powerful machinery generally, while the force is trained to work systematically and as rapidly as possible. The foundry at Schenectady, for instance, 650 feet long and 175 feet wide, is divided into three sections, or floors; the main floor has two 10-ton and two 25-ton high-speed overhead cranes. At the lower end of the foundry there are 30 Tabor molding machines, with eight 5-ton cranes; numerous pneumatic hoists help the molders to set their cores. The output of this shop is seven cylinders per day, corresponding to 50 to 60 tons. Two days are generally necessary to finish an American cylinder, one day for molding, one night for drying, one day for remolding and pouring. Four days are required for a double-compound locomotive cylinder. Floor iron is always cast in green sand by means of white metal patterns and Tabor molding machines.

The output of German foundries is necessarily lower; the Borsig foundry casts about two cylinders per day, with a total output of about 40 tons of cast iron. Molding machines are less extensively used than in America and are generally hydraulic, which makes them necessarily much slower than the American machines. The latest and most up-to-date German foundry, at Hannover, does not possess a single molding machine; it requires about seven days to cast a cylinder in Germany.

French foundries are generally much older and their equipment out of date as compared with those of Germany and America. Molders and foundrymen are more experienced and careful; the castings produced have a much finer appearance; but the time required is a great deal longer, with the possible exception of one foundry, recently installed in the Nord district, which can easily deliver one cylinder in a week. In another large French foundry, now somewhat out of date, the following time is required for the casting of a double compound locomotive cylinder:

Molding	6 days.
Drying	2 nights and one day.
Remolding	5 days.
Total	12 days.

That is, practically two weeks. This foundry cannot therefore deliver more than four cylinders per week; about 20 tons of iron are poured per day and no night work is done.

The following table can now be established for making a double cylinder:

Schenectady	4 days.
Germany	7 days.
France	12 days.

Blacksmith Shop.

Blacksmith and hammer shop practice is radically different in Germany, the United States and France. In the two former countries, and particularly in the United States, parts are very roughly forged, and much more machine work is therefore necessary to bring them down to finished dimensions.

In France the common practice is to give the rough forging a shape and size approximating as nearly as possible the finished part. All Americans who have visited French shops have noticed with what perfection the French smith succeeds in forging parts. Yet it is incontestable that with the modern machine shop facilities and powerful machine tools, the utility of

leaving as little excess metal as possible on forgings disappears almost completely, and the careful French smiths' work becomes to a certain degree useless.

In Germany some of the most modern shops now use the oxhydric burner for the more complicated forgings, such as eccentric straps, rod straps, draft-gear hooks, etc., which are cut out at high speed (about 2¾ inches per minute, for 2-inch thickness). This practice saves making special dies.

French shops are beginning to use the same methods; the Denian shops, for instance, have recently welded mud-rings with an acetylene burner.

Boiler Shop.

French shops are incontestably superior to German and American as far as careful boiler work is concerned. The short life generally required of locomotives in the United States renders carefully finished work less necessary; however, even when French inspection is imposed, the work is gotten out much more rapidly in the United States than in France. This is due in the first place to the powerful machinery with which American shops are equipped, and also to their standard shop practice. Taking as an example the American Locomotive Co.'s boiler shop in Schenectady, which is wonderfully well fitted, and measures 650 feet long by 175 feet wide, the following table will show the order in which boilers are gotten out:

South ⟵						⟶ North
Bending	Drilling	Punching	Shearing	Laying out	Material (A)	
Riveting		Assembling		Erecting	Complete boilers	
Machine tools		Flanging presses		Crown stays and staybolts		Tubes

This order is always followed strictly; the plates are received from the mills through the door at (A) and follow the direction of the arrow, being successively laid out, sheared, punched, drilled (in series of four or five), then bent, welded and arrive thus to the southern side of the shop, and start up again along the middle aisle where they are first adjusted and riveted, then assembled and finally the complete boiler is put together. During this time, the fireboxes have been prepared in the eastern part of the shop; plates are flanged, and drilled, mud-rings milled and drilled, crown stays and staybolts threaded. The assembling of the boiler is done by the help of two 35-ton overhead cranes. Thus boilers advance from south to north as their construction is proceeded with. In this manner handling of boilers, etc., is reduced to a minimum; stays and staybolts are set by compressed air, which is distributed generously throughout the shop. On account of this logical and rigorously followed order and thanks to a large force (I have seen 18 men working at the same time on one of the Paris-Orleans fireboxes), astonishing results are obtained in the matter of quick execution. The most wonderful feat ever accomplished was the construction of a complete boiler in three days and three nights, from the laying out of the first plate to the last detail on the boiler. This is certainly remarkable, notwithstanding the fact that it is quite an exceptional performance, and that the finished boiler was probably not of highest perfection.

For establishing a comparison between the three countries, the construction of 30 boilers for the Paris-Orleans railway may be cited as an example. The Schenectady Works began by making dies for all firebox, firebox shell and side frame plates. These plates were then flanged, or bent, on a press without the least difficulty. In France the number of dies used was much smaller, and the firebox plates were flanged with small flanging presses. The same process was followed in Germany, but the boiler makers in this country being much less skillful than in France, caused a great deal of time to be lost. The fireboxes were placed in their shells only after many failures. Although it must be considered that 30 locomotives were ordered in America while only 10 were placed in France and Germany, and that therefore the American builders found it more to their advantage to make dies for all flanged plates, yet it is unquestionable that the method followed by the latter saved them much time and gave more accurate results.

Little difference exists between the German and French methods of boiler construction, and the only advantage in time which the former possess results from the fact that they work both night and day, and that their work is less careful. This is proved by noting that a German boiler shop which delivers ordinarily 30 complete boilers per month, only succeeded in getting out five French boilers in the same time, on account of more careful work being required by the inspectors.

Machine Shop.

In this shop, more than in any other, is noticeable the radical differences between American and European practice.

An American manufacturer who has paid $10,000 for a machine wishes to make it pay for itself in the shortest possible time by obtaining the largest possible amount of work from it and by keeping down repairs. On account of the constant improvements introduced in machine design, he will find it to his advantage to scrap this machine in a relatively short period of time, and purchase in its stead some new design, invented or improved during that time, which will be more powerful and yielding a better output.

In Europe, on the other hand, machine tools are still considered as delicate pieces of mechanism, requiring scrupulous care, whose life should be lengthened as much as possible by careful handling and frequent repairs. They are generally run by much lower power motors than used in America, and are not used except on carefully prepared forgings, in which the excess metal to be removed is reduced to a minimum. This naturally carries with it a great difference in the time required for machining different parts.

Here are some time studies taken in the three countries, milling side-rods; horizontal milling wheel:

	U. S. A.	Germany.	France.
Number of rods worked	2	1	1
Diameter of milling wheel	8 in.	5.12 in.	6 in.
Height of cut	4 in. x 2 in.	4.7 in.	4 in.
Depth of cut	½ in.	1.37 in.	0.15 in.
Cutting speed of tool	60 ft.	46 ft.	37 ft.
Feed	2 in.	1.12 in.	1.38 in.
Weight of chips per hour	175 pounds.	123.5 pounds.	14 pounds.
Time required (rods 7.3 feet long)	49 min.	88 min.	71 min.
Power	Elec. motor 50 horsepower.	Belt.	Elec. motor 12 horsepower.

This shows the time saved by the American machine. Two rods are milled on one side in 49 minutes, while one rod is milled on one side in 88 and 71 minutes, respectively, in Germany and France. The forging is placed on the machine in a much more finished condition in France, therefore the time gained in America in the blacksmith shop should be added to the time gained in machining. The French shop is, however, ahead of the German, but the time saved by the former is compensated fully by the

quicker forging work in Germany, which saving is considerably greater than the 17 minutes gained by the French.

Grooving side rods on horizontal milling machine:

	U. S.	Germany.
Number of rods	2	1
Type of machine	Bement.	Droop & Rain.
Size of wheels	11 in.	5.1 in.
Height of cut	3½ in. x 2 in.	2.67 in.
Depth of cut	1 in.	0.98 in.
Cutting speed	70 ft.	37.5 ft.
Feed	2 in.	1.53 in.
Weight of chips per hour	242.5 pounds.	68 pounds.

Planing four guides:

	Schenectady.
Cut	0.4 in.
Feed per minute	⅜ in.
Cutting speed	35¼ ft.
Weight of chips per hour	265 pounds.
Time required	5 hours.

For boring wheels, the Niles wheel lathes are extensively used in America and give interesting results. The *American Engineer* gives the following results (September, 1908,) obtained by such a lathe, worked by a 25-horsepower electric motor, when boring 55-inch tires with two tools:

	Schenectady.
Speed	21 ft. 6 in.
Feed	½ in.
Depth of cut	⅝ in.
Weight of chips per hour	160 pounds.

With one machine, a hoist and one helper, a man has been able to bore 41 tires in a 9-hour day. He could have bored 54 with two hoists and two helpers, in the Chicago shops of the Chicago & Northwestern railway. In Europe, with the air lathes generally used, the slowness of fixing, etc., and the lower cutting speed, only 6 tires can be gotten out in a 9-hour day.

These examples show the considerable advantage gained by Americans in using more powerful machines and harder tool steel. But these are not the only factors to be considered. American engineers have also succeeded in reducing the time required for mounting parts on machines to a minimum; as soon as the drawings are finished the drawing room designs and studies the quickest way in which these operations can be done. The foundry and machine shop make special jigs and supports whose shapes and size are such that after fixing them on a machine the workman has only to securely fasten all bolts holding the part to be machined. These jigs are numbered, and the same number appears on the drawing of the part, and the workman is thus advised what particular jig should be used for that part. The most remarkable application of this method is the manner in which the Schenectady Works of the American Locomotive Co. bored the double low-pressure cylinder in the recent Paris-Orleans order executed by them. As soon as the sides of the cylinder saddle had been planed, the cylinder was placed on the boring-mill by means of a large cast iron support, made in such a way that the center line of the cylinders coincided exactly with the center of the movement of the tools.

For milling the valves, planing, etc., three more similar jigs were made, thus avoiding all laying out and greatly reducing the possibility of errors. The same applied to driving boxes; these were planned in lots of 18, bolted to a cast iron jig, which held them rigidly in the required position. The high pressure eccentric cranks were also turned in this manner and the time for laying out was thereby saved.

European engineers are beginning to realize the large advantages derived from these methods, and several shops, such as the Eastern Railway of France, Epernay shops, and the Cail Locomotive Works at Denain (France) are introducing them. But European builders are rarely willing to invest so much money in up-to-date machine tool equipment, dies, jigs, etc., unless a large number of locomotives ordered in one lot justify this expenditure.

Erecting Shop.

Much more allowance being granted builders in the United States in fitting, etc., the latter are able to erect their locomotives in a very short time, as there is little adjusting to be done. For French locomotives, which are put together much more carefully and precisely, these facilities do not exist. Nevertheless, some remarkable results have been obtained in quick work, due principally to the specialization of the different gangs and the personal initiative which their foremen are allowed to use. The 300 men working in the Schenectady erecting shop are divided in 20 specialized gangs, while in Europe these gangs do not number more than 10 or 12. In America the different gangs work simultaneously on the engines which are on the floor; each gang foreman is permitted, on his responsibility, to begin operations on any engine he deems sufficiently assembled for the purpose. While the first Paris-Orleans locomotive required 38 days for assembling, the last but one only demanded 13 days, the workmen being thoroughly trained to the work in hand.

In Germany the assembling is not conducted on the same basis, as the frame is finished throughout, cylinders adjusted, etc., in a special shop, and is not placed over the pit until these operations are complete; the engine is therefore in an advanced stage of erection before it reaches the floor, and the time for assembling proper is therefore greatly shortened. But notwithstanding this, it takes from three weeks to one month before a French type of compound locomotive is ready for test. The Paris, Lyons & Mediterranean suburban locomotives now building at Hanover require as long as six weeks for erection.

Although in France it has taken up to 80 days to assemble an engine, there are some erecting floors very well organized, in which the labor is as much specialized as possible. Assembling is done very quickly, considering how complicated French locomotives generally are, and it often happens that an engine is only 15 days on the floor.

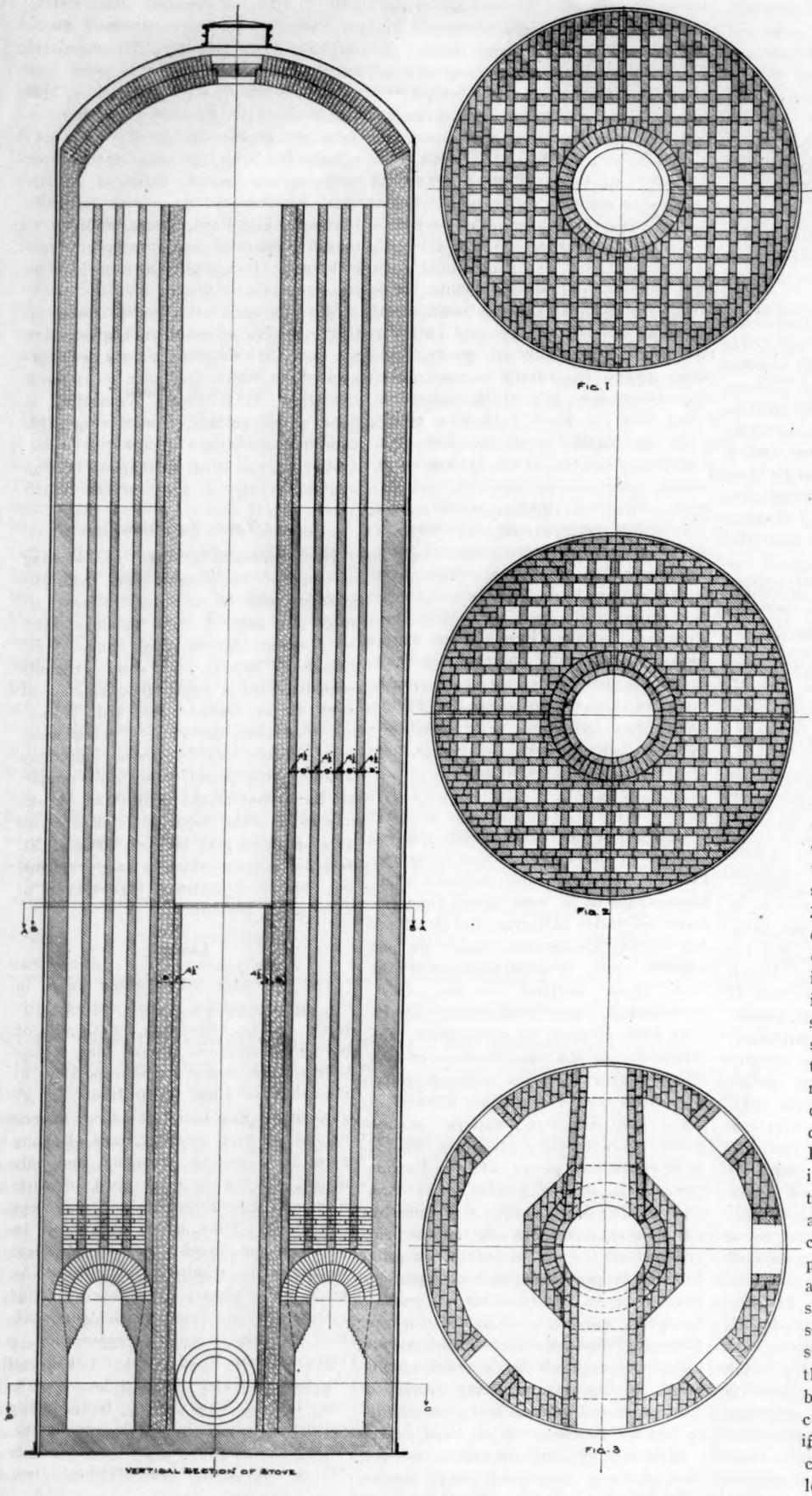
Yard Facilities.

The American practice of working as rapidly as possible has naturally brought with it a large increase of yard and general shop facilities, such as powerful cranes, yard engines, etc. European shops are now generally equipped with a fairly good amount of yard tracks, locomotives and cranes; but the latter, particularly, work much more slowly than American machines of the same power. For an example, all the cranes at the Schenectady works having 20 tons capacity or less move at a speed varying between 300 and 500 feet per minute, which is rarely reached by French or German cranes, even of very small capacity.

Labor.

The character of working men in the three countries is also entirely different. The American, desirous of having all comforts around him, wishes to earn the largest amount possible in the shortest time. All labor is organized on this basis; the labor unions uphold it very strongly, and, keeping away from politics altogether, and only acting for the financial good of their members, second the working man very effectively. Time labor, always to be preferred in work for which great exactness is required, is replaced by piece work whenever possible. In this system the workmen receive in addition to their regular compensation a certain bonus based upon the gain on standard time for the part he is working upon. This bonus is generally calculated so as to divide equally between the workman and his employer the amount gained on standard time.

(To be continued.)



VERTICAL AND TRANSVERSE SECTIONS OF NELSON HOT BLAST STOVE.

A NEW DESIGN OF HOT BLAST STOVE.

Simplicity in mechanical design is universally to be desired, and strange as it may seem to the casual observer, often most difficult to obtain. It is usually the final stage of a series of developments which started with complicated design and expensive construction. On account of the extremely severe demands of the service, the desire for simple construction, both strong and sane, has become a recognized essential for all details f blast furnace construction, and the recent invention of A. C. Nelson has done much towards bringing the design of hot blast stoves to that degree of simplicity and strength which should be aimed at in all structures. This invention, as described in a recently issued patent, is a stove having a circular wall surrounding the central combustion chamber, a circular wall close to the shell of the stove, and 9-inch square checkers filling the space between these walls. All the above are laid with standard 9-inch x 4½-inch x 2½-inch brick with the exception of the lining of the combustion chamber, which includes standard keys, and its false wall composed of standard 9-inch circles. The simplicity of the construction is readily perceived by referring to the horizontal cross sections of alternate courses shown herewith: Figs. 1 and 2. Each brick is absolutely bonded with the adjacent bricks without a break, making it practically impossible for any part to become deranged and giving a great degree of strength and solidity to the structure. As this construction is continuous throughout the checkerwork, but very few of the bricks could fall out of place even if the arches supporting the checkers were destroyed by long service. The arches are built in semi-circular

form, of standard 9-inch shapes, and in such a way to give great strength. This method carries the loads directly to the supporting walls with a minimum of lateral thrust and eliminates the use of any of the flat tile which have been found so disappointing in many stoves.

The only bricks used in the construction which are not standard 9-inch, or which exceed the 9-inch equivalent, consequently classed as "specials," are the 13½ x 5 x 4½-inch tile brick directly over the arches for supporting the checkers and the dome plug.

To appreciate the exceedingly small number of specials used, one has only to learn that they constitute, on the base of 9-inch equivalent, less than a ¼ of 1 per cent of the total brick in the stove. The use of this small percentage of specials makes it possible to manufacture each brick much more accurately and lay the entire mass better than is possible where many dfferent shapes must be fitted together like a puzzle picture. The amount of clay is consequently cut down, thick end or side joints are out of the question, and all the bricks are laid on thin natural beds with no tendency to rock or tip over.

The amount of heating surface compares favorably with other stoves now in use, and in some sizes gives a greater area.

It may be added that it is not compulsory to have the openings at the bottom of the stove located as shown by the accompanying illustrations. This type of lining can be adapted to any two-pass stove, regardless of the location of its openings and whether it has formerly been lined with sde or central combustion chamber.

Although the patent on this type of stove has but recently been issued, it has been well received and two are now in satisfactory operation and five others under construction.

Arthur G. McKee, engineer, Rockefeller building, Cleveland, with whom Mr. Nelson has been associated for some time, is introducing this stove to the furnace men of the country, and anticipates a still further recognition of its merits.

The American Car & Foundry Co. has taken an order for 40 package cars for the Western Pacific railroad, which has awarded the contract for 60 passenger cars to the Pullman Co., and the contract for dining and buffet cars to the Barney & Smith Co., Dayton, O.

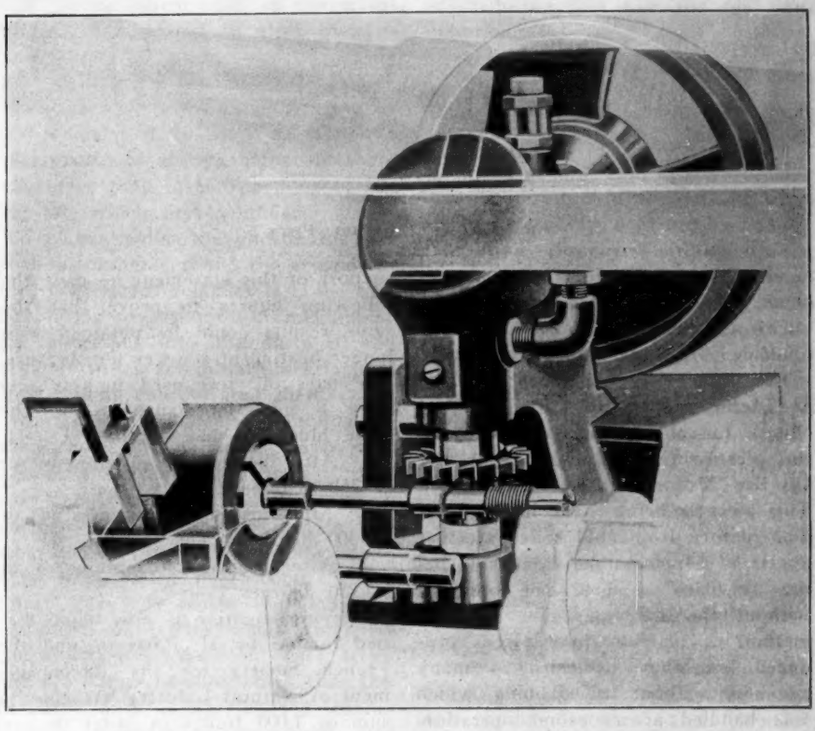


FIG. 1.—FRONT VIEW OF ATTACHMENT, SHOWING CUTTERS.

A NEW ATTACHMENT FOR AUTOMATIC SCREW MACHINES.

A simple and compact time-saving device for finishing duplicate parts requiring slabbing, milling or slotting across the piece has recently been designed for use on the Acme automatic multiple spindle screw machine.

The attachment, as shown in Figs. 1 and 2, is fastened to the top of the tool slide carrying the cutting-off tool, and operates on the piece in the third position while the thread is being cut.

Two milling cutters, set at a given distance apart on a vertical arbor, are driven by beveled gears from a shaft carrying a pulley which receives its power through a belt from a "Simpul" countershaft. The feed of the cutters is controlled by the cutting-off cam, its throw being increased by an auxiliary lever (D) Fig. 1.

The operation takes place during the time required for the forming and box milling operations in the first position, and while the stock is being held stationary in the third position for the threading operation. (For this reason, this attachment is adaptable only to "Acme" machines.) In at-

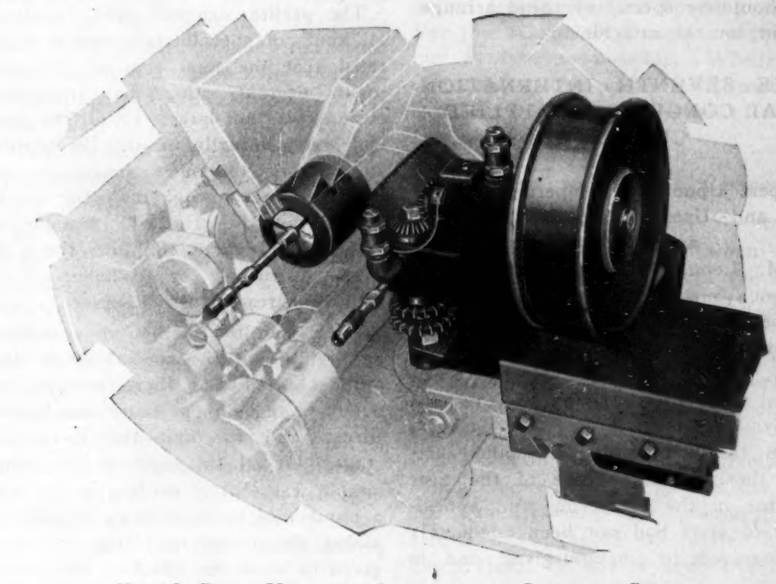


FIG. 2—REAR VIEW OF ATTACHMENT, SHOWING GEARS.

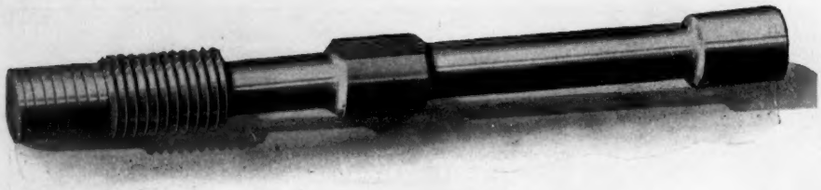


FIG. 3—THE FINISHED PIECE.

taching this device to a regular machine, it is only necessary to drill and tap two holes in the top of the cutting off slide.

This attachment was put on a No. 53 "Acme" automatic (a 1-inch machine) for the purpose of slabbing the piece shown in Fig. 3, for the Cadillac Motor Car Co. of Detroit. This piece is being made in the Cadillac factory from cold rolled steel at a rate of 53 pieces per hour, this being as many as could be obtained without the slabbing. The previous method of making these pieces produced less than one-third as many per hour without the slabbing, which was handled as a second operation. The entire cost of rehandling for this operation is saved by the use of this attachment, which is one of a number recently designed for this machine for eliminating rehandling of duplicate parts by drilling, milling, slotting, slabbing and countersinking parts on the machine, which previously required second operations.

It is possible to drive these attachments without the special countershaft by directly connecting them to the die spindle gears in the main tool slide, a telescoping shaft, knuckle jonts and beveled gears being used. This makes it possible to drive the machine with the single belt or motor without any special overhead arrangement for the attachment.

THE SEVENTH INTERNATIONAL CONGRESS OF APPLIED CHEMISTRY.[1]

Papers Upon the Tempering, Testing and Uses of Special Steels and Ferro-Alloys.

M. Leon Guillet, the well-known French metallurgist, contributed two papers to Section III-A, May 29th, upon the "Heat Treatment of Metals and Alloys," and "The Special Steels Used for Industrial Purposes," respectively.

In the first paper M. Guillet stated that the importance of the time factor in the tempering and annealing of steel had not been adequately recognized by metallurgists; and in support of this statement he gave the following figures to prove that the same results could be obtained with longer heating at a lower temperature. The bars of steel used in this test were 8 mm. in diameter, and the same blue tint was obtained.

1. After heating 10 minutes in air at 350 degrees Cent.
2. After heating 30 minutes in air at 300 degrees Cent.
3. After heating 240 minutes in air at 250 degrees Cent.

The investigation is now being carried further by M. Portevin, and the French Society for the Encouragement of Natural Industry has voted a sum of 1,000 francs in order to permit M. Portevin to continue his researches upon this subject.

The second paper on "The Special Steels" was of a highly technical character, and a short abstract only can be given here. M. Guillet stated that when studied by the micrographic method the special steels might be divided in the following classes:

1. The perlite steels containing ferrite or cementite.
2. The steels containing carburites of a complex nature enclosed in the perlite or sorbite.
3. The steels containing martensite or troostite.
4. The polyhedric steels.

The perlite structure was found in all kinds of special steel, and it indicated that the total sum of the elements present, other than iron and carbon, was not large. Of all the special steels actually in use, the perlite steels were the most important, although some of the polyhedric steels —such as the Hadfield manganese steel, the Invar steel, and the two steels discovered by Gillaume — have met with great industrial success.

Discussing the method of annealing and tempering the special steels, the author stated that there was a tendency to make these more simple and direct, and to omit the re-heating stage. Of all the methods the most simple was that of cooling in air; and a number of tests of steels containing nickel, chromium and manganese were given to show the effect of this method of tempering and annealing upon the physical properties of the steel. The full text of these two papers will be found in the June issue of the *Revue de Metallurgie.*

A paper upon the "Ferro-Alloys" was presented by M. Chaplet and read in Section III-A. The author stated that until 15 years ago the only ferro-alloys available for use in the iron and steel foundries were the following:

1. Ferro-silicon containing 10, 12 and 15 per cent silicon.
2. Ferro-manganese containing 7/8 per cent of carbon.
3. Ferro-silico manganese or silico-spiegel.
4. Ferro-chrome containing 0.9 per cent of carbon.

These alloys were produced in the blast furnaces or in the crucible furnaces of special design. The researches of Moissan, Goldschmidt and others, however, have placed a large number of alloys of iron with the rare metals, and of much greater purity, in the hands of metallurgists; and these alloys are now being employed for the manufacture of special steels. Thanks to the analytical and micrographic work of Messrs. Le Chatelier, Carnot, Goutal, Lebeau and Guillet, one now knows that a large portion of the carbon in these ferro-alloys is present in the form of a double carbide of the iron and the alloyed metal. Those double carbides (which offered great resistance to the attack of the chemical reagents used in the analysis), were often found ultimately in the form of isolated grains in the steel. These grains in addition to their brittleness, gave rise to other grave defects, as under certain conditions they became the centers of pitting, and thus of corrosive action on the plates. This is found to be especially the case with Marti-steel deoxidized with ferro-manganese carbide. The aluminum method of producing these ferro-alloys first solved the problem arising from the presence of these grains of carbide, in the finished steel. Electro-metallurgists have also now learned how to produce similar alloys containing a maximum of the alloyed metal and a minimum of carbon, in the electric furnace.

The Chaplet furnace, which is worked at Allevard-Giffre, is one of these modified forms of electric furnace, in which the use of a carbon base is dispensed with, in order to minimize the dangers arising from the presence of carbon in the alloys.

The high strength ferro-silicon alloys are very efficient deoxidizers

[1]London, England, May, 1909.

when used in the steel pot or bath, in spite of some disadvantages due to their low density.

There is one other point in connection with the use and application of these ferro-alloys to which attention must be drawn, and that is the advisability of selecting a deoxidizing agent which shall yield a very fluid slag, at the temperature of the metal or bath to which it is added. The ternary alloys, producing double silicates are the most satisfactory in this respect, and of these the manganosilico-aluminum alloy is one of the most interesting.

As regards the use of vanadium and titanium, the author stated that very diverse results have been obtained with very small additions of these two metals, and that possibly these differences are due to the affinity of these metals for oxygen, carbon and nitrogen, an affinity which no doubt is in part the cause of their utility. In order to obtain comparable and uniform results with these metals, it is therefore necessary to employ ferro-vanadium and ferro-titanium of *high strength*, containing little carbon, and to take great care that they are protected from atmospheric influence when being added to the bath or pot.

The final paper which can receive notice in this report was read in Section III-A, May 29, and was contributed by J. E. Stead, the famous English metallurgist of Middlesborough, the subject being "Alloys of Iron, Carbon and Phosphorus."

The paper was partly a review of the published work of Wüst and others, but also contained evidence to show:—

1. That the eutectic of both gray and white phosphoretic pig irons at the time of initial solidification is practically identical in composition.

2. That during the solidification, and in cooling down afterwards, of pig irons which are white when cold, the ternary eutectic containing about 2 per cent carbon and 7 per cent phosphorus remains as such in the cold metal.

3. That the eutectic when still liquid in gray pig irons is practically the same as that in white iron, but during solidification and afterwards when cooling down, the carbon diffuses out of it and there remains in the cold metal a binary eutectic of iron and phosphorus, practically free from carbon. This was proved by expressing by hydraulic pressure, the eutectic from the nearly solidified metal, analyzing what was squeezed out, and by examination of the corresponding gray iron under the microscope.

4. It is shown that as the phosphorus is increased in steel castings and ingots, when the carbon is between 0.10 and 0.5 per cent the ferrite enveloping the crystals increases proportionately in volume, and that the phosphorus is always higher in these envelopes than in the portions of the crystals which first solidified.

5. That whilst the phosphorus and carbon segregate round the crystals in the metal which solidifies last, the carbon during cooling down diffuses out of the envelopes into the parts of the crystals which are initially nearly pure iron, and is concentrated there.

6. That rolled steels containing little carbon, such as boiler plates, etc., almost always contain bands of ferrite free from carbon, and strings of particles of pearlite embedded in ferrite, also in bands. The white bands have been called microscopic "ghost lines." They represent the elongated envelopes of ferrite which surround the crystals in the cold cast steel, and are higher in phosphorus than the pearlite bands. This banded condition is normal in commercial soft steels in the rolled condition, and, judging from the result of much research, cannot be avoided without almost entirely eliminating the phosphorus.

The white bands are more pronounced the higher the phosphorus.

ELECTRIC DRIVEN ROLLING MILLS.[1]

By E. Frielander.

The first electric-driven steel rolling mill in the United States was installed about four years ago by the Carnegie Steel Co., at their Edgar Thomson Works. Since then a number of other electric mill drives have been installed and run with entire success, a noteworthy example being found at the steel plant at Gary, Ind.

The introduction of the electric drive has made it possible to clear up many points in regard to the power required for rolling different shapes of steel, and, moreover, the roller, or operator, is able to see at a glance the work done by each pass. The electric roll drive has also taught us how to get the best rotation among rotating masses, speed, time and horsepower. It has helped the roll designer to calibrate rolls in such a manner that the power characteristic for all passes is uniform, thereby avoiding high power peaks, decreasing the size of the prime-mover, and reducing first cost and fuel consumption.

[1]Proceedings of the American Institute of Electrical Engineers, July, 1909.

Uses of the Meter.

The watt-hour meter warns the roller of bearings or rolls becoming tight and hot, or that steel is causing excessive fricton in the passes, often due to overfilling, cold steel or faulty calibration, thereby guarding against damage to the rolls and bearings. The meter indicates that lower heat, greater elongation and especially change of profile in different directions, increase the power required at the rolls much more rapidly than do chemical hardness, high tensile strength, or larger draughts. The meter also shows that it is not the higher percentage of carbon in steel which requires more power in rolling but the lower temperatures at which the steel has to be rolled, and also that an increase in width of the steel shape requires more power than a decrease in height. By means of the meter, too, it can readily be seen that rolling "squares" and "rounds" takes per square inch displacement much less power than shapes with large peripheries and many flanges, as the latter cool off quickly and cause much friction in the rolls.

Tests on rail mills have shown that the foot-pounds per square inch of displacement gradually increase the nearer the rail is to the finishing pass. A 75-pound rail required 1,100 foot-pounds at the first pass on the first "rougher." On the same stand in the seventh pass it required 3,000 foot-pounds, in the first pass on the second roughing rolls 4,800 foot-pounds, in the fifth pass 8,150 foot-pounds; 9,500 foot-pounds were required for the last or finishing pass. For this reason the flanges are rolled out as late as possible. Whenever required, exact power consumption can be given for each phase of rolling.

The Engine and Motor Compared.

The ideal motive power for rolls should drive them slowly when the steel enters and should drive the roll faster as the piece lengthens. The reciprocating engine will do just the reverse, run very fast without load and slow down as the load increases, finally stopping if the load becomes too great.

The maximum torque of reciprocating engines is fixed by the size of the cylinders and the pressure; it cannot be increased no matter how much steam or gas is available. For this reason most mill engines are

made very large and often run with only half load, causing high steam consumption per horsepower, their most economical cut-off being at full load.

For this work the characteristics of the electric motor are much better. Even with double its full torque, the efficiency is good and the motor will not stop, but will take more and more current, finally becoming overheated and burning, unless properly protected. If desirable, its speed changes from no load to full load can be made small. The current can also be limited to a certain maximum, without stopping the motor, in this manner preventing excessive strains and probably serious breakdowns.

Where high speeds are necessary, motors can be direct-connected to rolls, increasing the energy of the rotating parts and at the same time decreasing the size of motor, the power required and the fuel consumption. Heavy reciprocating engines cannot run at such high speeds, and must be connected to the rolls by means of gears, ropes or belts.

Power Requirements.

To obtain accurate information as to the exact power requirements for rolling steel, indicator diagrams were taken on reciprocating engines doing similar work, but these in many instances were misleading. The work of rolling steel is very changeable and intermittent. Engines often run with light loads, but at short intervals have their valves wide open. This, together with the work done due to energy of the rotating parts, should be carefully observed. Although it probably is not difficult to get the maximum torque required to decide on the normal capacity of the motor, the above-mentioned points must be considered, together with the length and number of pieces in the rolls, and also time intervals between passes. To be on the safe side it is advisable to follow standard mill practice and make motors of ample size and strength, in order to stand the severe service and overloads without injury.

In mentioning fly-wheels, the writer had only three high non-reversible mills in mind. As the weight of rotating parts is much greater in large motors than in reciprocating engines, and the energy of the rotating parts increases as the square of the speed, it is obvious that even a small change in speed is of great importance. As tests have shown that rotating masses are sometimes not only of no use but they often prove a drag on the motor, careful study of this feature has to be made in each case.

Size of Motor.

While the steel is being rolled, both the motor and the fly-wheel should furnish the power, but as soon as the steel leaves the rolls the motor should accelerate the rotating masses to the same speed as before rolling. The time available and the number of revolutions will determine the size of the motor more than anything else.

It has been observed that on blooming and roughing mills, where the pieces are very short and the intervals long, rotating masses supply the largest part of energy during the rolling period and should therefore be large. The reverse takes place at the finishing passes, where pieces are long and follow each other rapidly. Heavy rotating masses would in this case be useless, and would even require larger motors for their quick acceleration.

Where one motor drives roughing and finishing rolls, curves should be plotted showing the number of pieces in the rolls at the same time, the length of passes and intervals, the power required for each pass, etc. With the help of such curves the best relation between the sizes and speed of the motor and fly-wheel, radius of gyration and slip of motor can be easily determined.

The total motive power required in a steel plant is changeable and fluctuates continuously, the average in many plants being often below one-fourth of the total horsepower installed in motors. The electric-driven rolling mills will, however, demand considerably larger power stations to take care of the large currents, especially when all the motors happen to be overloaded at one time, as for instance when rolling cold steel. It is very important to find out beforehand how much of this fluctuating load the power house may have to supply, assuming the worst conditions, as the shut-down of the electric power station for even a very short time, will stop the operation of a large number of machines and cause enormous losses. This is the one very objectionable feature of making such a great number of prime movers entirely dependent on one power station, and, therefore, some means should be taken to prevent this disturbance.

Suppression of Peak Loads.

With steam engines and boilers the liability of a complete shut-down is not so great, but the delays and annoyances caused by low steam pressure are of daily occurrence in many plants. In such cases not only will all the steam-driven prime movers be unable to develop the required power, but also in trying to develop this power they will use more and more steam, thus making it difficult to raise the steam pressure without increasing the number of boilers, or decreasing for a while the load and consequently the production.

The short, high-peaked current demands should be kept off the power station as much as possible and only the average current be supplied. The least number of units can then be kept running under nearly full load with the most economical fuel consumption and the least wear and tear of moving parts. As before mentioned, the average current consumption in a steel plant is always small in comparison with motor capacity on account of the intermittent work and large amount of inertia of the rotating parts. By means of storage batteries or fly-wheel sub-stations the occasional large demands for current can be taken off the station and supplied from these two sources, where it is stored up when the current demand is below the average.

Electric Reversing Mills.

The exchange of current from one motor to another, in connection with electric roll-drives, is often considerable and should not be overlooked.

With regard to the electric reversing mill, it is a fact that soon after its first appearance the use of reversing rolls became more general, especially in England and Germany. In those countries small quantities of one kind and shape of material are rolled, and the cost of the large number of rolls required and the saving of time in changing rolls are probably the chief reasons for using the reversing mill, where many different sections can be worked with the same rolls. The absence of the heavy and troublesome lifting tables is also a welcome feature, especially when pieces rolled are very long.

The first installation in this country of an electric reversing mill, at the Illinois Steel Co.'s works at South Chicago, has given entire satisfaction from the start, and has demonstrated that the electric motor is much better adapted for this kind of work than the reciprocating engine. Although the first cost was high, its lower depreciation, better operation and lower cost of maintenance should justify its installation.

In a reversing mill the operator is able to draw steel slowly into the

rolls and "speed up" while the piece lengthens, making a great advantage in rolling steel. In order to obtain perfect speed regulation, no use can be made of steam expansion, but admission continues during nearly full stroke. Even this depends much on the skill of the operator, who can subject the engine and the mill to very severe shocks and cause serious breakdowns if he is not careful. Reversing mills are, therefore, made heavy and strong.

If too much steam is admitted, it is difficult to prevent such large engines from racing without load. It is also wasteful, as both the time of actual rolling and the speed of the loads are limited, most of the power being consumed in the rapid starting and stopping of the heavy rotating parts, without making any use of their fly-wheel energy.

Ease of Operation.

With the use of electric motors in place of reciprocating engines, the problem of reversing rolls becomes much simpler and better, in regard to manipulation, fuel consumption and cost of maintenance. Operation of electric-driven reversing mills is nearly automatic; no skilled operator is required and all danger to the motor and the mill is eliminated. The speed of acceleration is prearranged, and no matter how fast the operator moves his levers, the maximum current and the speed are limited.

Reversing is done with the least shocks in rolls and couplings and the danger of overstraining machinery is done away with. It is important to be able to reverse the motor just as rapidly as the engine. Special care should therefore be taken to have a motor-generator that will give large currents with very low excitation, and one that will be quickly magnetized and de-magnetized.

It has been observed that only one-fourth of the power required at the reversing-roll motor is the average supplied from the power station. The large current demands are furnished by the motor-generator through the energy of the high-speed fly-wheel, and a considerable amount of current is sometimes sent back into the line.

As for all other mill work where power and speed variation are considerable, the direct-current motor, on account of its load and speed characteristics, is better adapted for driving rolls than the alternating-current motor. For reversible roll drives it is used exclusively.

There is no reason why the direct-current motor should give any more trouble than the direct-current generator at the power station. Four years' experience has shown that the wear of the commutator and the cost of maintenance amount to practically nothing. The transmission of large low-tension currents is much more serious, especially when tens of thousands of horsepower have to be supplied and the distance of the motors from the station is considerable.

High Tension Currents.

The use of higher direct-current voltages in connection with large rolling mill motors should be satisfactory; but no doubt high-tension alternating-current transmission and induction motors direct on the line will be generally employed, especially in new installations. Where conditions demand it, the induction motor characteristics can now be made nearly similar to the compound-wound, direct-current motor. However, much of its simplicity and efficiency will be sacrificed in doing this.

Among some of the earlier disadvantages of the induction motor were: very large current required for starting under heavy load; one speed fixed by the number of poles and the tendency always to run at synchronous speed; impracticability of reversing large units; and inability to change speed to fly-wheel requirements.

In the design of the modern rolling-mill motor, most of the objectionable points have been remedied by different means such as wound rotors; the introduction of variable resistance; changing the number of poles; shifting the phases; slip rings, etc.

Whether direct-current power stations and direct-current motors are used, or alternating-current stations are installed for high-tension transmission with alternating-current motors directly on the line or fed through transformers, or direct-current motors are supplied from an alternating-current station through converters, or motor generators, batteries or fly-wheel sub-stations, is a matter of detail. Any one of these systems will give satisfaction if properly designed and installed.

TRADE PUBLICATIONS.

AN ENGINEER'S HAND BOOK.—The Erie Engine Works, Erie City, Pa., have gotten out an Engineer's Hand Book, which contains a vast amount of information for engineers and others, in condensed form, which will be sent engineers and people interested in mechanical appliances generally, upon application. It contains 90 4 x 6½-inch pages.

GAS PRODUCERS.—The Smith Gas Power Co., Lexington, O., in their Bulletin No. 4, describe types of suction and pressure gas producers, built by them, including details of construction and methods of operation.

MONEL METAL SHEETS.—Monel Metal is now fairly well known in the metal working trades, and The American Sheet & Tin Plate Co. have issued a booklet, dealing with its applications in sheet metal work, which they announce that they are prepared to forward upon application.

PRESSED STEEL RADIATORS.—The Pressed Radiator Co. of America, Pittsburg, Pa., are distributing a 24-page 6 x 9 inches catalog, describing the Kinnear Pressed Steel Radiators, in various designs and their method of construction, and also setting forth the various advantages claimed for them.

DRAWING TABLES AND FILING CASES.—The Economy Drawing Table Co., Toledo, O., have issued a new catalog, 48 6 x 9-inch pages, describing their line of drawing tables, filing cases, and office furniture. The catalog shows a number of additions to the line formerly made.

CORK.—Once in a while a catalog which is distinctive finds its way into the office. Such a one is that distributed by The Armstrong Cork Co., Pittsburg, Pa., which sets forth, in a very graphic and interesting way, the production of cork in its various forms, from the tree to the finished article. Besides being descriptive of the manufacture of cork, it conveys a lot of information as to the cork tree, its growth and the history of its uses, not generally met with.

PUNCHING AND SHEARING MACHINERY.—One of the best gotten up catalogs that has come under our notice in some time is that of The Long & Allstatter Co., Hamilton, O., descriptive of a line of punching, shearing, bending and straightening, riveting and forging machines built by them. It contains 208 7 x 10-inch pages, and the cuts and press work are altogether exceptional. The data furnished for the different machines is very brief and concise, and yet exactly to the point.

ROPE DRIVING.—Another piece of remarkably fine catalog making, entitled "Twenty-Five Years of Rope Driving," issued by The Dodge Mfg. Co., Mishawaka, Ind. The Dodge Co. have sent out much matter, mechanically praiseworthy, but they have not sent out anything more deserving of credit. The book contains 104 9 x 12-inch pages, and the paper, cuts and letter press are amongst the best we have ever seen.

ORNAMENTAL IRON WORK.—The Chester B. Albree Iron Works Co., Pittsburg, Pa., have issued their catalog No. 9, containing 170 6 x 9-inch pages, illustrating various designs of bridge railings, portal crestings, newels and lamp posts, cornices, stair ways, fence and gate designs, window guards, etc.

AUTOMATIC CONTROLLING VALVES.—The Ideal Automatic Mfg. Co., 125 Watt street, New York City, have issued a booklet, describing their automatic pump governors and simple and compound pressure controllers, pressure regulators, etc.

RUBBER MILL MACHINERY.—The Mesta Machine Co., Pittsburg, Pa., have issued a bulletin, describing their calendars, grinders and mixers.

REFERENCE TABLES FOR GAS USERS.—Tate, Jones & Co., Inc., General Offices, Pittsburg, Pa., have just issued, through their advertising department, some very valuable "Ready Reference Tables" compiled in pamphlet form, which is being distributed gratis to those interested.

NEWS FROM MANY INDUSTRIES

New Buyers:—

The Northwestern Tool & Mfg. Co., Minneapolis, has been chartered by D. Sundstrand, A. H. Johnson and C. A. Ericsson, with $50,000 capital stock.

The Missouri Hills Zinc Co., Joplin, Mo., with a capital of $400,000, has been incorporated by Budd M. Robinson, Alice M. Robinson and Leroy S. Dewey.

Harvey Lane, R. F. Reynolds, O. H. Eggert, Julius Lehmann and R. B. Wilson have incorporated as the H. Lane Mfg. Co., Toledo. The capital stock is $30,000.

The Success Fuel Burner Co., Chicago, with $100,000 capital stock, has been incorporated by Charles D. Wright, Adolph Kaestner and J. A. MacKenore, to do a general manufacturing business.

The H. L. Brown Fence & Mfg. Co., Norwood, O., capitalized at $15,000, has been incorporated by James E. Nimmo, Rudolph Strauss, Herbert L. Brown, Henry Brown and Jeanette K. Brown.

The Imperial Mfg. Co., Cleveland, has applied for a charter through these incorporators: J. H. Orgill, G. H. Wiesenberger, D. E. Evans, J. E. Matthews and G. H. Knuppenberg. The capital stock has been placed at $10,000.

A charter has been granted to P. McGarry & Son, Chicago, to manufacture and deal in boilers, tanks, reservoirs, etc., with an authorized capital of $20,000. Those interested are William Becker, L. Higgie and J. J. Crowley.

The Berkshire Machine Co., Pittsfield, Mass., has been chartered to manufacture and sell machinery, with $5,000 capital stock. The officers mentioned are: President, Homer F. Marshall, North Adams, Mass.; treasurer and clerk, John A. White, Pittsfield, Mass.

A certificate of incorporation has been granted to the Sheet Steel Tube Co., Chicago, capitalized at $5,000, the object being to manufacture sheet steel tubing and the machinery necessary thereto. A. W. Eissener, Otto H. Faeschner and R. E. Wirth are the stockholders.

The Uhler Motor Car Co., St. Joseph, Mo., has filed articles of incorporation for the manufacture of an invention which is an improvement on internal combustion engines. The capital stock is $100,000. Francis M. Uhler, Herbert R. Lewis, Robert S. Graham and Edwin M. Swartz.

The W. Scott Hardware Co., New York city, has applied for a charter authorizing it to manufacture hardware tools, with $10,000 capital stock. The incorporators are Joseph W. Scott and Thomas F. Brown, 49 Warren street, and George C. Kennedy, 302 Broadway, all of New York city.

The Chicago Pump Co., Chicago, has been incorporated for the purpose of manufacturing pumps and machinery, with a capital stock of $10,000. Those interested in the new corporation are George W. Killelea, R. H. Wilson, Henry Horner and Whitman & Horner, Stock Exchange building, Chicago, Ill.

The Fischer Save-All Co., Hinckley, N. Y., has been granted a certificate of incorporation with an authorized capital stock of $5,000. The company will build machinery for manufacturers of wood pulp, paper, etc., and has these incorporators: John F. Fischer, Joseph H. Drouare, Roy V. Kingsbury, Hinckley, N. Y.

Briggs, Shafner & Co., Winston-Salem, N. C., recently incorporated with $125,000 capital stock and elected the following officers: President, W. F. Shafner; vice president, W. C. Briggs; secretary-treasurer, N. H. Willis; general manager, H. F. Richter. The company will erect a machine shop with a larger capacity than its former plant.

A charter has been granted to the International Horseshoe Co., New York city, which is capitalized at $100,000. A. Bennett Aldrich, 27 Thames street; Carl W. Bliss, 2609 Broadway, and A. M. Kolstad, 170 Broadway, all of New York city, are among the incorporators. The company proposes to manufacture horseshoes, tools, and rolling mills.

Articles of incorporation have been filed by the Minnot Industrial Co., New York city, to deal in and exploit patents and inventions. The company's capital stock is $10,000, and its incorporators are Julius M. Ferguson, 103 West Ninety-first street; M. G. Huerstel, 653 East Twenty-ninth street, and Edmund Huerstel, of the same address, all of New York city.

E. Waterman Dwight and William T. Dunning, of Philadelphia, have made application for articles of incorporation for the Industrial Supply & Equipment Co., the object of which is to manufacture, construct, erect, repair, buy and sell machinery, tools, shop equipment, railroad supplies and mechanical devices of various kinds. Mr. Dwight is president and treasurer of the Chester Steel Casting Co., Chester, Pa., and treasurer of the Kingston Coal Co., and Mr. Dunning is secretary of the former corporation. The services of G. W. Perry, M. E., an engineer of national repute, have been secured in connection with the company.

The Automatic Meter Guard Co., Chicago, which will engage in the manufacture of water meters, with a capital of $100,000, has been incorporated by Augustus F. Hintze, William F. Freudenreich, W. H. Chamberlin, 1545 Marquette building, Chicago.

New Construction:—

The Pennsylvania Foundry Co., York City, Pa., has been granted a permit to erect a new pattern shop and foundry building.

The Gawley Foundry & Machine Co. will build a drydock at Marine, Wash., to cost $250,000.

The Faries Mfg. Co., Decatur, Ill., is now utilizing the addition to its foundry building, construction of which was begun early in the spring.

The Columbus Wire & Iron Works, Portland, Ore., is about to begin the erection of a brick building to be occupied as headquarters of the company.

The American Steel & Wire Co. will erect a larger steel and concrete warehouse and distributing plant in Seattle Wash.

The Oklahoma Midland Electric Railway Co. has awarded to the J. A. Kauffman Co. the contract for the construction of two 8,000-horsepower water power plants.

The Mandt Wagon Co., Stoughton, Wis., has laid the foundation for a brick and steel power house, 50 x 118 feet in dimensions. This is the beginning of the thorough modernizing of the plant, which is to be operated by electric power.

The steamshop of the American District Steam Co. is to be moved from Lockport, N. Y., to Tonawanda, N. Y,. and within a few days work will be started upon the erection of the new machine shop, which is to be 26 x 100 feet, and three stories high.

The S. Morgan Smith Co. is perfecting plans for an addition to its

pattern shop. The proposed structure will be fireproof, 115 x 53 feet, with reinforced concrete floors. This building is necessitated because of the lack of room in the present pattern shop.

Ground has been broken by the La-Crosse Plow Co., for the construction of a foundry 300 x 75 feet in dimensions.

The Iowa Stove & Range Co., Waterloo, Ia., is about to begin the construction of a foundry 80 x 136 feet in size.

Dries & Kramp Mfg. Co., makers of machinery, Chicago, have let the contract for a shop building 66 x 120 feet, to cost $12,000.

The Chattanooga Sewer Pipe & Fire Brick Co., located at West Eleventh street, Chattanooga, will erect a one-story brick and reinforced concrete and steel machine shop, to cost $9,500.

Work has been begun on the plant of the Quanah Foundry Co., Quanah, Tex., and it is expected that the plant will be in full operation within the next 60 days.

Ground has been broken for the new sheet mills of the Youngstown Sheet & Tube Co., the construction of which was authorized some time ago. Work on the new tube mills and warehouse is progressing rapidly.

Among extensive improvements planned by the Defiance Machine Works, Jacksonville, Fla., is the erection of a large warehouse, which will be begun immediately. The new building will be of brick and concrete construction, fireproof, one story, 66 x 133 feet in dimensions.

The Buffalo Copper & Brass Rolling Mill, Buffalo, advises regarding the building permit taken out recently that it is erecting an addition 76 x 140 feet, to be used in connection with its present plant for manufacturing brass and copper in the roll, sheets, rods, wire and tubes.

The Wheeling Mold & Foundry Co., Wheeling, W. Va., announces that it will erect a 25-ton steel casting furnace, with elaborate brass cutting machinery, the outlay representing something like $75,000. The erection of the new plant will be superintended by Alexander Laughlin & Co., Pittsburg.

The Badger Motor Car Co., Columbus, Wis., whose incorporation was noted in a recent issue, advises that it has just purchased a 20-acre tract and will begin the erection of shops at once. Business is being carried on in temporary quarters, until the new building will be ready for occupancy.

The Chicago & Northwestern Railroad Co. has awarded the contract for the construction of three 50-foot span, double tracked steel bridges, over the Neenah and the Menasha branches of Fox river and Little Lake Butte des Morts, near Neenah, Wis., to O'Keefe & Orbison, of Appleton, Wis. The estimated cost of the work is $1,500,000.

The Geuder, Paeschke & Frey Mfg. Co., of Milwaukee, Wis., has started work on the three buildings to be added to the Milwaukee works, announcement of which was made several months ago. The new buildings are: Factory No. 14, 130 x 180 feet, four stories high; galvanizing room No. 16, 40 x 110 feet; pickling room No. 1, 40 x 60 feet.

The Shenango Furnace Co. has completed a combination machine, carpenter and blacksmith shop of brick, 50 x 175 feet, at Hibbing, Minn. All the machines and forges will be operated by separate motor drives. The machinery is being installed at the present time, and the shops will be operated as soon as the power plant, which is under consruction, can be completed.

The structural work on the addition to the plant of the American Roll & Foundry Co., Canton, O., will be started in a short time by the Canton Bridge Co. The addition to the machine shop will be 60 x 60 feet, while that to the foundry will be 60 x 40 feet. Both are to be of brick and structural steel, and a 25-ton electric crane is to be installed in the machine shop. It is thought that the work will be completed by September 1.

The Keystone Steel & Wire Co., South Bartonville, Ill., has been granted a permit to erect a building 90 x 550 feet, which will be used as an addition to its fence factory. Further recent improvements in this company's power plant are the installation of coal and ashes handling machinery, and a 150-kilowatt direct-current Crocker-Wheeler generator, direct connected to a Skinner high speed engine. Plans for a cooling tower, 64 x 17 feet and 20 feet high, are under way, and a 16 x 20 x 24-foot circulating pump will complete the outfit. Many other machines and motors are also being installed.

General Industrial:—

The Monarch Motor Car Co., Chicago, was thrown into involuntary bankruptcy July 8 by creditors who sought the appointment of a receiver for the company, which is said to be financially involved.

The Strobel Bridge Co., which recently was awarded the contract for a highway bridge at Philadelphia, is in the market for the plain material, amounting to about 2,500 tons.

The Peacock Iron Works, Selma, Ala., will be sold at public auction some time this month.

The Progressive Metal Refining Co., Milwaukee, has increased its capital stock from $25,000 to $50,000.

The Kitselman Bros. Co., Muncie, Ind., is at work on the construction of an addition to its wire fence plant.

The Tod County Hardware Co., Elkton, Ky., has filed notice of increase of capital from $8,000 to $12,000.

The Portsmouth Stove & Range Co., Portsmouth, O., has closed its plant for several weeks in order to make annual repairs.

The Provo Foundry & Machine Works, Provo, Utah, has purchased 11 acres of land with the intention of building shops for doing heavy steel work.

The McKee Construction Co., 405 Iowa street, Muskogee, Okla., is now in the market for iron and steel for school building construction.

The Portland Foundry & Machine Co., Portland, Ind., is soliciting subscriptions for an increase of its capital stock from $25,000 to $50,000. A drop forge department is to be added to its plant.

The Silver Mfg. Co., Salem, O., has moved its equipment into its new shop, which is of fireproof construction. The erection of this shop was begun last fall, when fire destroyed a large portion of the plant.

The Toledo Machine & Tool Co., Toledo, O., has recently shipped to St. Louis three carloads of toggle drawing presses; also a carload of punch presses to England. An addition to this company's plant is nearing completion.

Announcement is made that the annual meeting of the Westinghouse Electric & Mfg. Co. will be held at the company's offices in East Pittsburg, July 28, for the election of the four directors whose terms will expire this year.

The Muskogee Iron Works, Muskogee, Okla., of recent incorporation, advises that it is ready to begin operations. This concern will make all kinds of brass and gray iron castings, structural iron work, and in addition will do blacksmithing and boiler work.

The Universal Machine Co., Baltimore, Md., has been declared insolvent, and Thomas N. Copenhaver has been appointed receiver by the circuit court.

Within the next few weeks, the Heany Wire Co., York City, Pa., will install a number of new machines,

necessitated by the increased demand for its product.

A receiver has been asked for the Western Gas Engine & Machine Works, Seattle.

The Grays Harbor Railway & Light Co., Aberdeen, Wash., is building a new machine shop.

The Connellsville Iron Works, Connellsville, Pa., has secured several large orders recently, which will necessitate the running of night shifts within a few days.

The Hart & Crouse Co., Utica, N. Y., advises regarding the recent fire, that a very small loss was sustained, the fire being confined to a small, one-story frame warehouse.

The Standard School Desk Mfg. Co., Columbus, Ga., is in the market for machine shop equipment, including 12, 18 and 30-inch screw cutting machine, lathe, shaper, single spindle press, bolt cutter, pipe and milling machines and planer.

The receivership of the Jeanesville Iron Works, Hazelton, Pa., was terminated recently by court order. The company has made satisfactory settlement with its creditors, and to meet the demands of its growing business, will increase its working force.

The McManigal Grateless Furnace Co., Columbus, O., advises respecting an increase of capital stock from $10,000 to $30,000, that this increase was for the purpose of buying all of the patents covering a grateless furnace used in kilns for burning clay products.

The Carlisle Johnson Machine Co., of Hartford, Conn., has begun manufacturing operations in a new plant at Manchester, Conn. The company manufactures friction clutches and marine reversing gears under special patents. Some special machinery will be added to the present equipment.

The Robesonia Iron Co., Ltd., Robesonia, Pa., advises regarding the fire in its locomotive house, June 17, that the loss was about $5,000, partially covered by insurance. Plans are ready for a large fireproof building, the construction of which is to commence within a few days.

The Eagle Crucible Steel, Brass & Iron Foundry, Chester, Pa., advises in regard to the construction of its plant, mention of which was recently made, that it has a fully equipped plant with all facilities for handling brass, iron and crucible steel, employing about 50 molders.

Olin, Giberson & Hilands, Inc., New York City, advise regarding their recent incorporation that they have no intention at the present time of engaging in manufacturing of any kind, but that they have accepted the selling agency for the Ohio Seamless Tube Co. and the Central Tube Co., of Pittsburg.

The recent sale of the properties of the Passaic Steel Co. to Lawrence Fagan, of Hoboken, N. J., for $190,000, has been set aside by the federal court at Trenton, N. J., which has named in the place of the three receivers former Chancellor Magie. Bondholders had complained that they were not given sufficient time to bid more than the figure accepted before it was knocked down.

A temporary injunction was granted June 3 by a judge at Duluth, Minn., restraining the Pittsburg Iron Co. from taking over the properties of the United Iron & Steel Co., of Pennsylvania, and issuing $5,000,000 worth of bonds in payment. The restraining order was granted at the resuest of N. J. McKeefry, of Leetonia, O., a minority stockholder in the Pittsburg company.

The Southwestern Iron & Steel Co., recently incorporated with $80,000 capital stock, as successor to the Gainesville Iron Works, Gainesville, Tex., will engage in the manufacture of store fronts, sad irons, grate bars, sash weights, etc. Plans are under way for the extension of this company's plant.

Regarding the incorporation of the Illinois Pump & Brass Co., Peoria, Ill., the company advises that articles were taken out for the manufacture of hydraulic, electric, gas and gasoline water lift motors. Although the factory is well equipped for the present output, it is contemplated that a foundry will soon be added.

The Early Sun Stove & Range Co., Newark, O., of recent incorporation, was organized with the following officers: President, L. S. Dean; vice president and manager, C. E. Ludy; treasurer, George Wise; and secretary, Edward Mathias. The new company has taken over the foundry belonging to the former stove company at Somerset, O., and in addition has purchased several new patents on stoves, burners and furnaces, and it expects to start its foundry at Somerset within a few days.

Among recent orders taken by the Crocker-Wheeler Co., Ampere, N. J., are the following: One 1,000-kilowatt three-phase, 6,600-volt turbo-generator, to the DeLaval Steam Turbine Co., Trenton, N. J.; one 400-kilowatt three-phase 240-volt alternator, to be used for power and light, the Smith Gas Power Co., Lexington, O.; one 330-kilowatt three-phase 60-cycle generator, to the A. C. Cheney Piano Action Co., Castleton-on-Hudson, N. Y.; three 250-volt direct current generators, with a total capacity of 500 kilowatts to the George A. Fuller Co., Chicago, Ill. These are in addition to several other orders for smaller motors and generators.

The General Motors Co., of Detroit, recently acquired the Cadillac Motor Car Co., of the same city. The consideration involved is such as to make it one of the greatest industrial transactions in the history of the automobile business. The Cadillac Co. is one of the largest in the country, employing at the present time in its various departments, 3,400 skilled mechanics, with an output of 10,000 automobiles for 1909. The new company has been capitalized at $1,500,000 with the following officers and stockholders: President, Lem W. Bowen; vice president, Clarence A. Black; treasurer, William H. Murphy; secretary, W. C. Leland; manager, H. M. Leland; A. E. F. White, A. E. Leonard, E. E. Sweet, A. C. Leonard and H. H. Pattee.

Fires:—

The Billmyer & Small car shops of York, Pa., were totally destroyed by fire July 4. The conflagration was started by smouldering fireworks.

The power house of the United States Cast Iron Pipe & Foundry Co., Birmingham, Ala., was recently struck by lightning, this necessitating the shut down of the plant for a short time.

Fire destroyed the plant of the Cambria Forge Co., Johnstown, Pa., July 6, entailing a loss amounting to about $70,000. Sparks from a chimney are said to have started the conflagration.

The power plant of the Youghiogheny & Ohio Coal Co., at Barton, O., was totally destroyed by fire July 4, causing a loss of between $75,000 and $90,000, partly covered by insurance. Thousands of dollars will be lost by the company through the enforced idleness of the Barton, Maple Hill mines, 700 miners being idle. The plant will be rebuilt at once.

The Somerville Iron Works, Somerville, N. J., owned by Benjamin Lisberger & Co., of New York City, and the Carbon Stove Works were destroyed by fire July 8. The conflagration started in a small lumber heap in the yard of the stove works, which was so insignificant when first discovered that it caused no alarm. However, workmen were unable to cope with the flames, owing to lack of pressure in the water mains. The loss is estimated to be $125,000, partly covered by insurance. The iron industry of Summerville is practically ruined, as hundreds of iron workers are thrown out of employment.